AN INTERIM REPORT ON THE INVESTIGATION OF FLOODING IN THE TUG FORK BASIN OF KENTUCKY, VIRGINIA, AND WEST VIRGINIA

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Cover photograph: Flood of April 1977 at Williamson, West Virginia
(photograph courtesy of Charleston Daily Mail)

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FACTORS FOR CONVERTING INCH-POUND UNITS TO INTERNATIONAL SYSTEM OF METRIC UNITS (SI)

The following factors may be used to convert the inch-pound units published herein to the International System of Units (SI).

Multiply inch-pound units	By	To obtain SI Units
	Length	
inches (in)	2.54×10^{1}	millimeters (mm)
	2.54×10^{-2}	meters (m)
feet (ft)	3.048×10^{-1}	meters (m)
miles (mi)	1.609×10^{0}	kilometers (km)
	Area	
acres	4.047×10^{3}	square meters (m^2)
	4.047×10^{-1}	square hectometers (hm^2)
	4.047×10^{-3}	square kilometers (km^2)
square miles (mi^2)	2.590×10^{0}	square kilometers (km^2)
	Flow	
cubic feet per second (ft^3/s)	2.832×10^{1}	liters per second (L/s)
	2.832×10^{1}	cubic decimeters per second (dm^3/s)
	2.832×10^{-2}	cubic meters per second (m^3/s)
	Mass	
tons (short)	9.072×10^{-1}	megagrams (Mg) or metric tons

AN INTERIM REPORT ON THE INVESTIGATION OF FLOODING IN THE TUG FORK BASIN OF KENTUCKY, VIRGINIA, AND WEST VIRGINIA

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ABSTRACT

An analytical plan is presented for a study of the effects of land-use changes on the magnitude and frequency of flood-peak flows and on sediment characteristics of the Tug Fork in Kentucky, Virginia, and West Virginia. The plan includes compilation and analysis of available data, collection of new data on small, single land-use drainage areas for deterministic computer modeling, and creation of a computer model of the Tug Fork basin for definition of cumulative land-use impacts.

Also presented is a compilation of the available hydrologic data and a description of related studies expected to provide information and data useful to the ongoing work. The data compilation includes: Hourly precipitation for selected days and annual maximum daily precipitation for nine sites, annual maximum streamflow rates and stages for three stream-gaging sites, hourly gageheight and discharge rates for selected storms at four stream-gaging sites, flood profiles, flood-frequency relations, and other streamflow information.

INTRODUCTION

The purpose of this report is twofold:

1. To describe the investigation being performed by the U.S. Geological Survey in cooperation with the U.S. Bureau of Mines and with the Office of Surface Mining, Reclamation, and Enforcement to define the effects of land use on the surface-water hydrology of the Tug Fork.

2. To assemble, summarize, and publish available hydrologic data for the Tug Fork. General descriptions of the Tug Fork basin and the investigation are contained in the main text of this report. Detailed hydrologic, climatologic, and land-use data are presented in the appendices.

The Tug Fork basin encompasses about 1,560 square miles of the mountainous area of Kentucky, Virginia, and West Virginia (figure 1). The river serves as the political boundary between Kentucky on the west and West Virginia on the east. It joins the Levisa Fork at Louisa, Kentucky, to become the Big Sandy River. The Big Sandy River flows northward to join the Ohio River at Catlettsburg, Kentucky. Mining of the extensive coal deposits is the primary industry in the basin.

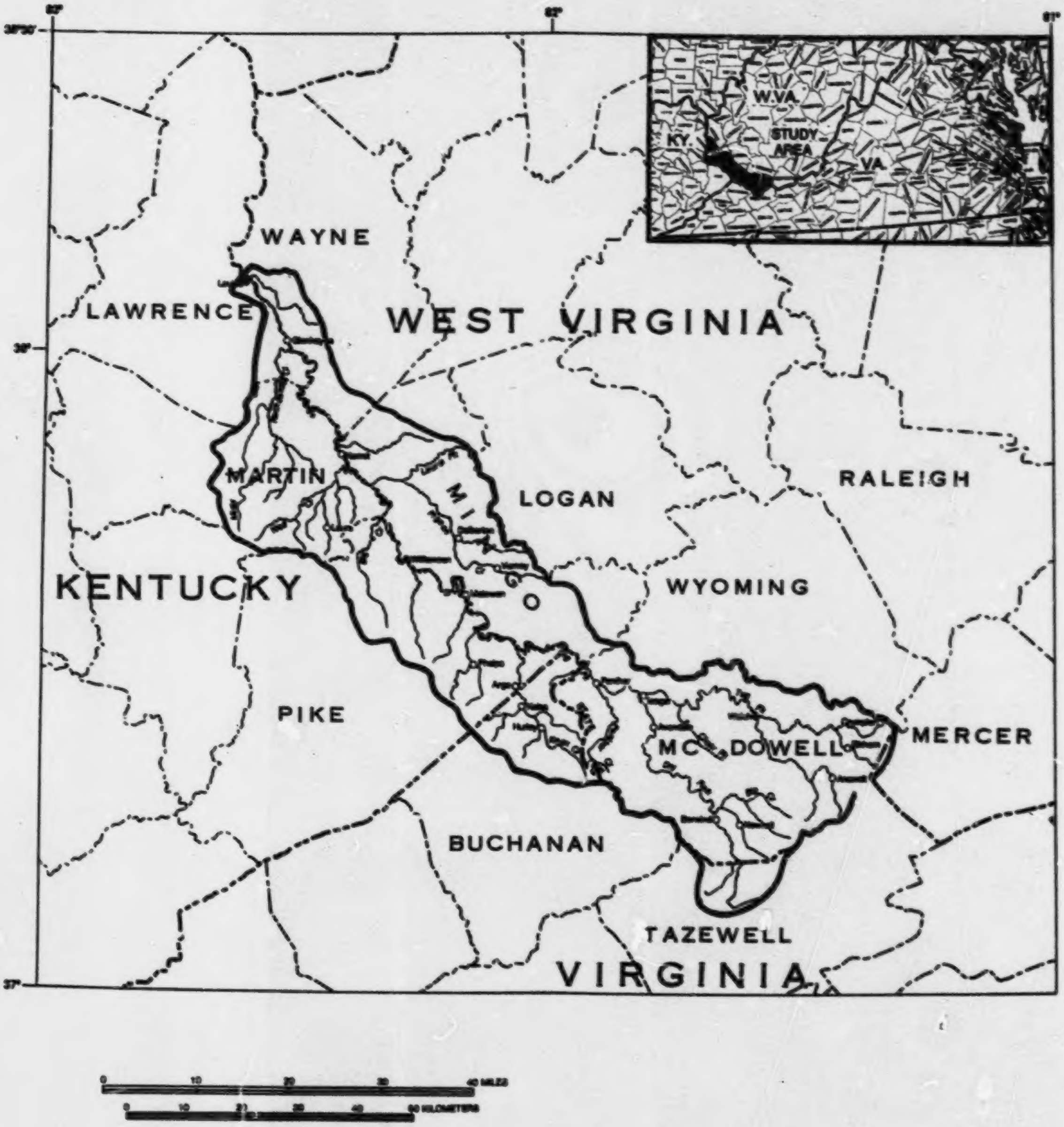


Figure 1.—Location of the Tug Fork basin.

Flooding has long been a major problem in the basin. Most of the inhabitable land lies on the narrow flood plains between steep mountains. Both the Tug Fork and the Big Sandy river basins have a long history of devastating floods. Carol Crowe-Carraco (1979), referring to a Civil War experience of 1862 in the Big Sandy River basin, states "Orlando Bowles, a young lieutenant of the Fortieth Ohio and later a prominent Big Sandian, could not have enjoyed the Middle Creek campaign and his first days in the Big Sandy. It was raining and had been for several weeks. The ground was soaked, and mud covered the infantrymen from head to toe as they slogged along. The Big Sandy River, swollen by rain and melting snow, had risen sixty feet from its lowest watermark and was flooding. Yellow torrents of water seemed to be everywhere. Paintsville was under water; Piketon (sic.) had steamboats on Main Street; and at Camp Buell, Bowles's tent and equipment were swept away by the raging river. The record flood of January-February 1862 played havoc with the countryside, and supplies from downriver were cut off." And in reference to 1927, "In the midst of reduced production and wage cuts came the most devastating flood the region had suffered in years. During the night of May 30, 1927, rain fell for twelve hours, and the Big Sandy River and its tributaries flooded their banks with unprecedented vehemence. A wall of water thirty feet high inundated the valley's log cabins and frame dwellings, and close to a hundred people died. Automobiles vanished, and livestock drowned." (Crowe-Carraco, 1979).

On April 4-5, 1977, an extremely devastating flood occurred in the Big Sandy River basin. Economic damage approached $50 million in the Tug Fork valley alone (Runner, 1979, and Runner and Chin, 1980). This flood has prompted much speculation as to what affect various land uses, particularly surface mining, has had on the flood and sediment discharge characteristics of Appalachian rivers. There has been no large-scale investigation that has definitively answered this question.

BASIN DESCRIPTION

Physiography and Topography

The Tug Fork basin encompasses nearly 1,560 square miles of Kentucky, Virginia, and West Virginia. Some of the principal tributaries to the Tug Fork are Pigeon Creek, Panther Creek, Elkhorn Creek, and Dry Fork in West Virginia, Knox Creek in Virginia, and Rockcastle Creek in Kentucky. About 60 percent of the basin is in West Virginia, 30 percent in Kentucky, and 10 percent in Virginia. Nearly the entire basin is in the Kanawha section of the Appalachian Plateau physiographic province as defined in Fenneman and Johnson (1946).

The topography of the basin is characterized by narrow river valleys bordered by steeply rising mountains. It is not uncommon for mountains to rise 1,300 feet above the valley floor. Maximum elevation of about 3,400 feet occurs in the headwaters and the minimum elevation of about 530 feet occurs at the mouth.

Geology

The following general description of the geology of the Tug Fork basin is taken from U.S. Army Corps of Engineers (1979) except the strategraphic names have been capitalized to conform with U.S. Geological Survey usage.

"The Tug Fork basin lies on the southwestern fringes of the deepest portion of the Appalachian sedimentary basin. The northern portion of the study area displays the classical concentric outcrop pattern of horizontal strata in which the younger Pennsylvanian bedrock (Conemaugh Group) is found in the uplands while the older Pennsylvanian bedrock (Kanawha Formation) is exposed in the stream valleys. The Conemaugh Group is composed primarily of a cyclic sequence of shale, siltstone, and sandstone with thin limestone and coal beds. Underlying the Conemaugh in the north is the Allegheny Formation, consisting of cyclic sequences of sandstone, siltstone, shale, limestone, and coal. The underlying Pottsville Group, composed of the Kanawha Formation, the New River Formation, and the Pocahontas Formation, is the most prevalent exposed bedrock in the Tug Fork basin. The group is composed of over 50 percent sandstone with some shale, siltstone, and coal. It is in this group of sedimentary rock that most of the coal resources of the area can be found. All of the bedrock in the study area, with one minor exception, is Pennsylvanian in age.

The outcrop pattern shows that the strata in the southern portion of the Tug Fork basin dip to the northwest, so that progressively older formations are exposed in the south. The surface drainage system also exposes these older beds in the stream valleys. The extreme southeastern portion of the basin contains the only Mississippian-age outcropping sandstone in the study area, along the axis of the Dry Fork Anticline.

A series of extremely gently sloping anticlines and synclines, trending approximately east-west, cross the basin in the north. The Warfield Fault, also cutting across the northern part of the study area, is a normal fault in the Pennsylvania-age bedrock, with the upthrown side to the south. There is about 200 feet of vertical displacement along this fault, and the surface topography remains relatively undisturbed over it.

The Quaternary deposits consist of recent river alluvium (sands and gravels) deposited on the floodplain floor of the Tug Fork and along the banks of its major tributaries. The source material for the majority of these deposits comes from the upland slopes at the head waters and along the banks of the rivers. Soil cover on these slopes tends to be relatively thin because the steep slopes allow the soils to be washed into the river during periods of even moderate rainfall. The river can carry a large load of sediment during times of high flow or flooding (usually the spring). It deposits the sediments on its banks and at different points in the channel as its load-carrying capacity and energy are reduced during periods of low flow. Floodplain deposition occurs when flood waters recede and suspended material is laid down on the floodplain. Channel deposition occurs when physical constraints cause the river water velocity to be reduced, thus decreasing its carrying capacity. The deposits may occur as point bars along the inside of sharp bends, while the outside of the bend is simultaneously being scoured. Deposition also may occur as delta bars, formed by tributary streams building deltas into the channel of the main stream. Deposits, ranging in size from fine silts to boulders, are commonly found in the channel and have been carried considerable distances downstream during floods and high water."

Climate

The climate of the area is characterized by a moderately severe winter with frequent alternations of fair and stormy weather and hot, showery summers. Mean annual precipitation is about 44 inches. The mean minimum January temperature is about 28° F. and mean maximum July temperature is about 88° F. The basin is in an area of prevailing westerly winds that, during the colder portions of the year, are interrupted by northward surges of warm air and and southward surges of cold air associated with the passage of high- and low-pressure cells. The low-pressure areas are the large-dimension storms known as extratropical cyclones. Because of these fluctuations, most snowstorms are followed by thawing periods and there is no wide-scale spring melt of an accumulated snowpack. Snowfall varies greatly within the area, but the area west of longitude 81°30' receives about 15 inches per year (Horn and McGuire, 1960).

The mean monthly temperatures and normal monthly precipitation for Williamson, West Virginia, (1941-70) shown in figures 2 and 3 are typical of much of the basin.

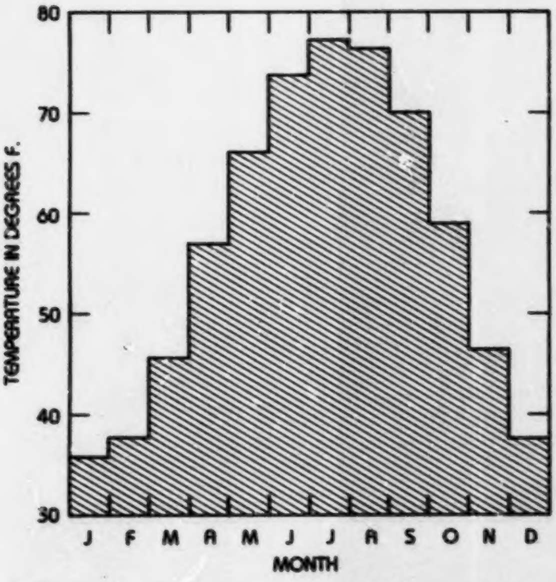


Figure 2.—Mean-monthly temperature (1941–1970) at Williamson, West Virginia.

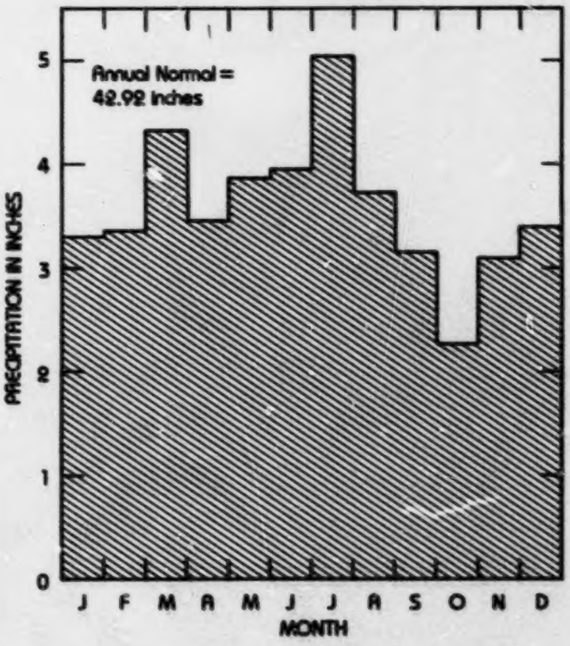


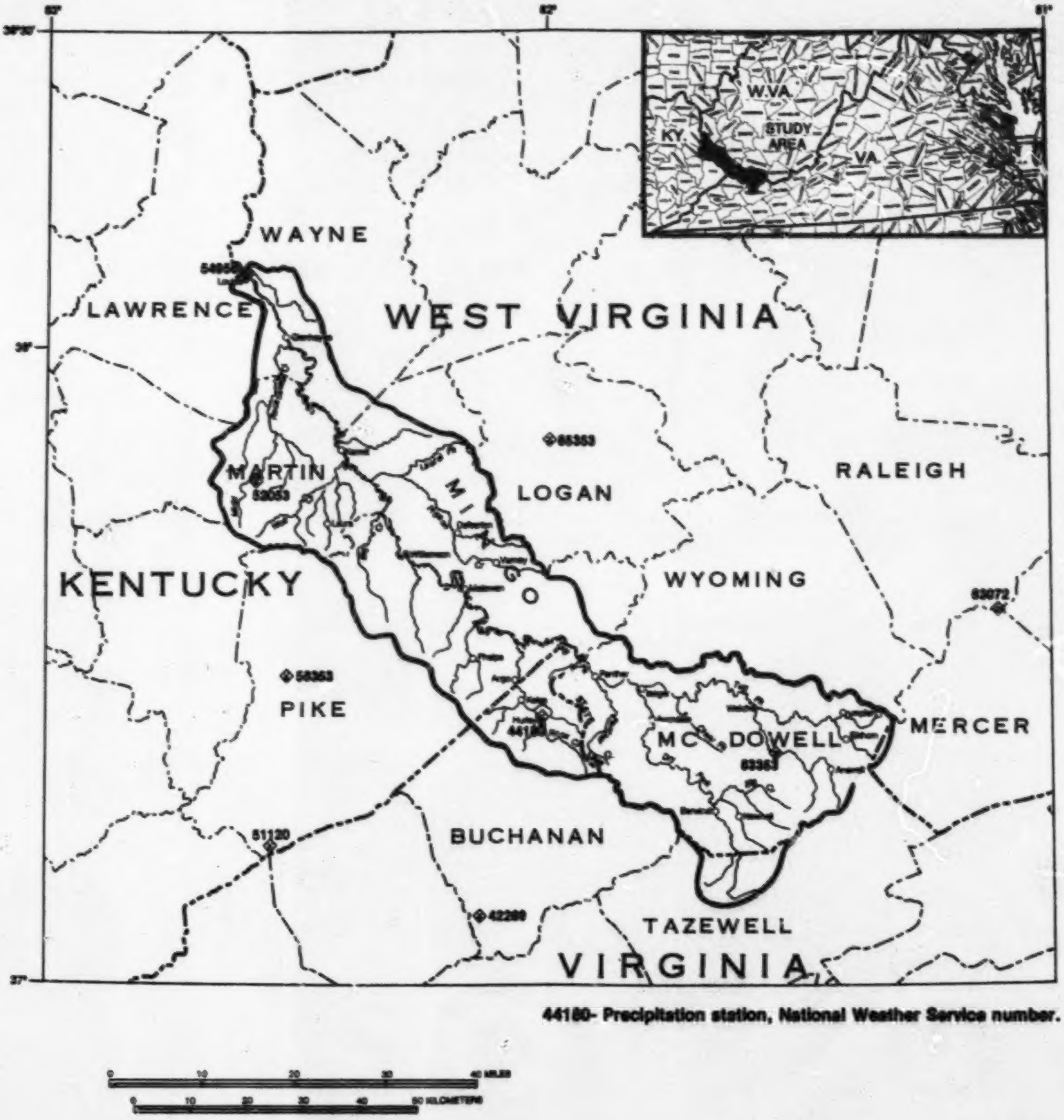
Figure 3.—Normal-monthly precipitation (1941–1970) at Williamson, West Virginia.

Intense rainfall is a common source of flooding in the basin. An extreme storm occurred in April of 1977. Maximum observed rainfall for this event was 15.5 inches in about 30 hours at Jolo, West Virginia, which is more than twice the amount expected for a 100-year recurrence-interval storm (Runner and Chin, 1980).

The following table shows the name, number, location, and period of record for National Weather Service recording precipitation stations established prior to 1955 in and near the Tug Fork basin. The location of these sites is shown on figure 4.

Table 1.--Recording precipitation stations established prior to 1955 in or near Tug Fork basin.

Name	NWS Number	Location Latitude	Location Longitude	Period of Record
		TUG FORK BASIN		
Davella, KY	52053	37°48'	82°35'	1940
Hurley, VA	44180	37°25'	82°01'	1941
Gary, WV	63353	37°22'	81°33'	1941
		ADJACENT		
Burdine 2 NE	51120	37°13'	82°35'	1951
Louisa 2 SW	54946	38°07'	82°38'	1941
Pikeville 2	56353	37°29'	82°32'	1934
Virginia				
Davenport 2 NE	42269	37°07'	82°06'	1940
West Virginia				
Flat Top	63072	37°35'	81°06'	1940
Logan	65353	37°51'	82°00'	1941



44180- Precipitation station, National Weather Service number.

Figure 4.—Recording-precipitation stations established prior to 1955 in or near the Tug Fork basin.

Hourly rainfall values at these sites for the eight largest flow events occurring since 1950 at Kermit, West Virginia, and the annual maximum daily precipitation value for the period of record for each are shown in Appendix A.

Hydrology

The Tug fork flows northwest for about 150 miles from its headwaters on the West Virginia-Virginia border to its confluence with the Levisa Fork at Lousia, Kentucky. The river is generally winding in a narrow steeply-sided valley through most of its length. River depth at base (low) flow varies from a few inches in the headwater tributaries to about 10 feet at Glenhayes, West Virginia. Width of the main channel ranges from 50 feet or less in the headwaters to over 250 feet in the downstream reaches. Because of the steep slopes, much of the development in the basin is along the narrow flood plains. The width of these flood plains varies from a few hundred feet in the upstream reaches to about 1,800 feet at Williamson.

The Geological Survey operates 11 gaging stations that provide continuous records of streamflows in the basin. The locations of these sites are shown on figure 5. Station number, name, drainage area, and period of record are listed in the following table:

Table 2.—Continuous-record streamflow gaging stations in the Tug Fork basin.

Station number	Name	Drainage Area (mi^2)	Period of Record
03212600	Tug Fork at Welch, WV	85.8	1979-
03212700	Elkhorn Creek at Maitland, WV	73.3	1979-
03212985	Dry Fork at Avondale, WV	225	1979-
03213000	Tug Fork at Litwar, WV	505	1930-
03213500	Panther Creek near Panther, WV	31.0	1946-
03213590	Knox Creek near Kelsa, VA	84.3	1980-
03213700	Tug Fork at Williamson, WV	936	1967-
03213800	Pigeon Creek near Lenore, WV	93.9	1979-
03214000	Tug Fork near Kermit, WV	1,188	1934-
03214700	Rockcastle Creek near Inez, KY	-	1980-
03214900	Tug Fork at Glenhayes, WV	1,507	1976-

Additional data for these sites including annual peak discharges, average discharges, maximum discharges, and minimum discharges are contained in Appendix B.

Runoff in the basin is generally highest during February and March and lowest during September and October. A typical distribution of streamflow is illustrated in figure 6, a hydrograph of the mean of monthly discharges for 1934 through 1979 for station 03214000 Tug Fork near Kermit, West Virginia.

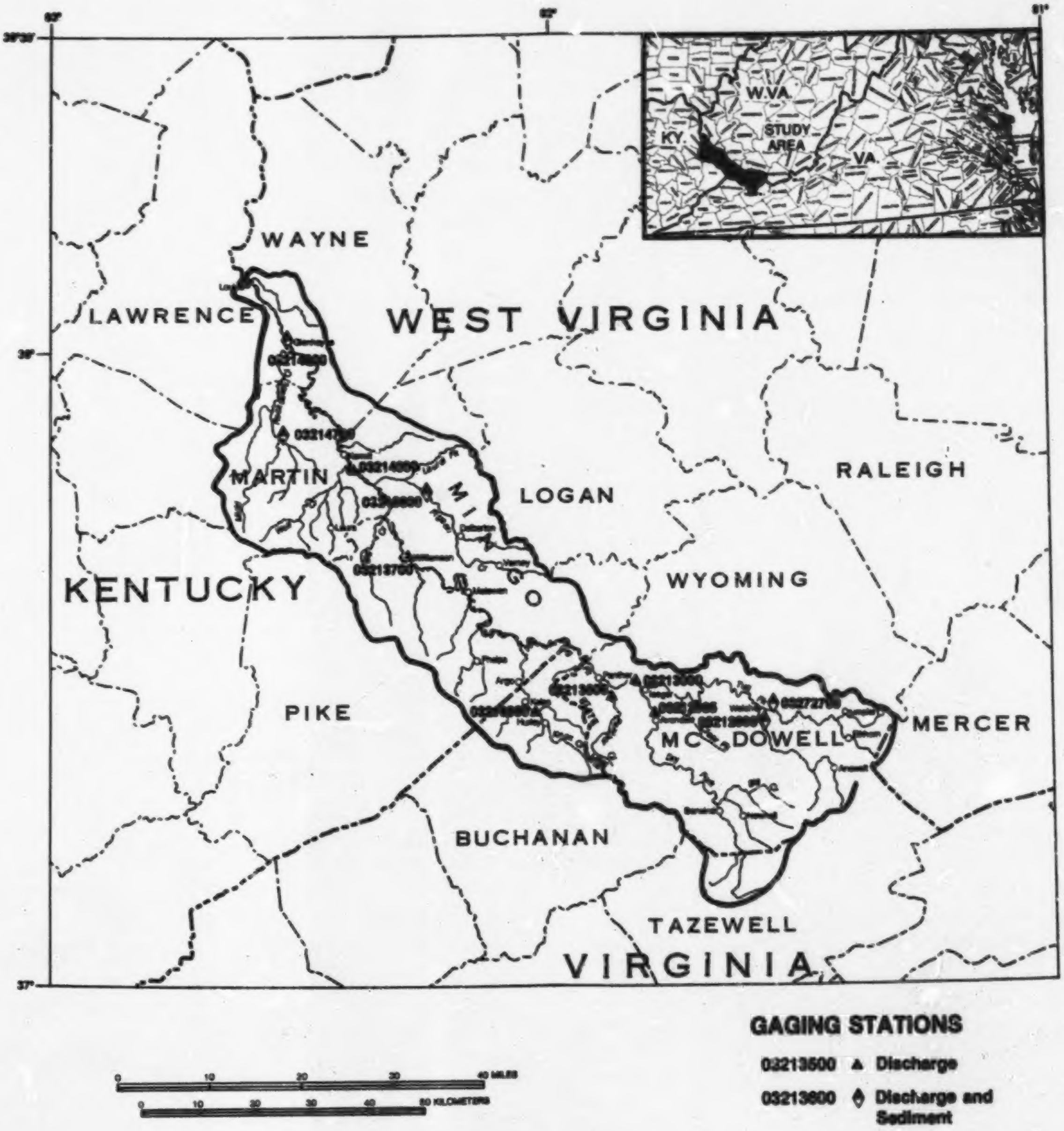


Figure 5.—Continuous-record streamflow-gaging stations in the Tug Fork basin.

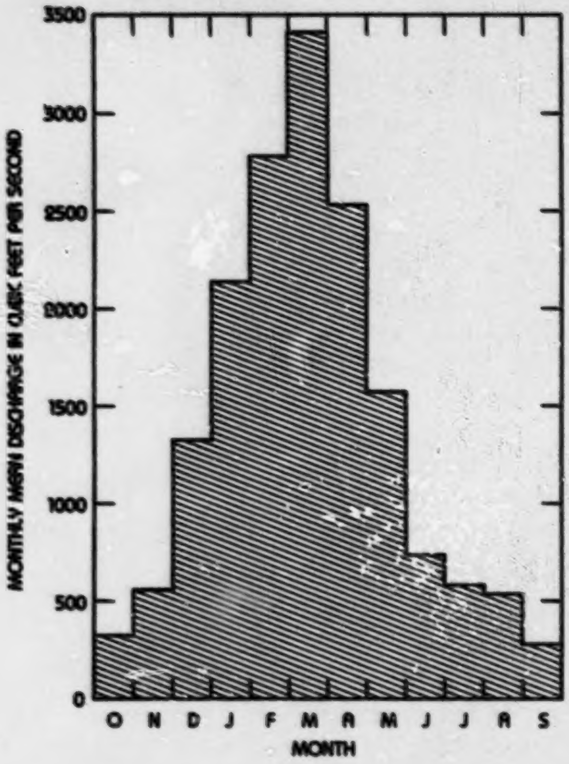


Figure 6.—Monthly mean discharge (1934–77) at gaging station 03214000 Tug Fork near Kermit, West Virginia.

The maximum observed discharge in the basin was 104,000 ft^3/s. This flow occurred during April 1977 at station 03214000 Tug Fork at Kermit, West Virginia. The recurrence interval (average number of years during which a given discharge is equalled or exceeded) of this discharge at this site is in excess of 100 years (Runner and Chin, 1980). Other major floods in the basin occurred during 1875, 1918, 1955, 1957, 1963, and 1967. Water-surface profiles for these and other events are shown on plate B-1 in the appendix. Appendix B contains additional data on streamflow including Log-Pearson Type III frequency curves for annual peak flows for stations in the basin with 10 or more years of record. The annual peak-flow frequency curves were computed using techniques recommended by the U.S. Water Resources Council (1977). Also presented in Appendix B are hourly stages and discharges for the eight largest flows that have occurred since 1950 at selected stations in the basin. Associated rainfall data at 9 sites in or adjacent to the basin for these flow events are contained in Appendix A.

Systematic collection of suspended sediment and other water-quality data in the basin has started only recently. Suspended sediment data are currently (1980) being continuously collected by the Geological Survey at the following stations:

Table 3.—Suspended-sediment stations in Tug Fork basin.

Station Number	Name	Period of Record
03212600	Tug Fork at Welch, WV	October 1978 - present
03212700	Elkhorn Creek at Maitland, WV	November 1978 - present
03212985	Dry Fork at Avondale, WV	October 1978 - present
03214900	Tug Fork at Glenhayes, WV	March 1977 - present

The maximum observed daily suspended sediment load at station 03214900 for the period of record was 320,000 tons on April 5, 1977; minimum was 2.2 tons on September 29 and 30, 1978. Maximum observed daily mean concentration was 4,020 mg/L on April 5, 1977; minimum daily mean was 4 mg/L on September 29 and 30, 1978.

Continuous data on specific conductance are also collected at station 03214900.

Additional data on water quality are periodically collected at selected sites in the basin as part of the "coal hydrology network." Appendix B gives information on the location and data collected at these sites (also see RELATED INVESTIGATIONS).

All of these data are published annually in the U.S. Geological Survey annual series of reports on water resources data for each State (U.S. Geological Survey, annual series).

Land Use and Cover

The Tug Fork basin is predominantly rural. The cities of Williamson, West Virginia, with a population of about 5,500 and Welch, West Virginia, with a population of about 4,600 (U.S. Geological Survey, 1970) are the major areas of urbanization. The remaining population is scattered among the small towns and single-family dwellings located throughout the river valleys.

Historically, land use in the basin has changed from small individual homesteads and gardens to the extensive surface mining of today. Coal mining has been widespread in the basin since the late 1800's. Prior to World War II, mining was mostly by underground methods. Since that time, the use of surface-mining techniques has accelerated greatly. The increase in the use of surface mining is probably because of the improvement in stripping machinery and the increasing energy-related demands for coal.

From 1880 to 1910, logging was an important industry in the basin. It was reported that hundreds of log rafts were floating along the Tug and Levisa Forks in May 1903, and by May 11, 1903, over 1,000 rafts docked at Catlettsburg (Crowe-Carraco, 1979).

Vegetation in the basin consists primarily of deciduous hardwoods with some scattered conifers.

Figures 7, 8, and 9 are photographs illustrating various types of present land use in the basin. Figure 7 shows urban and highway utilization of a flood plain, figure 8 shows logging, and figure 9 shows surface mining.

Figure 7.—Urban and highway utilization of flood plain along Tug Fork.

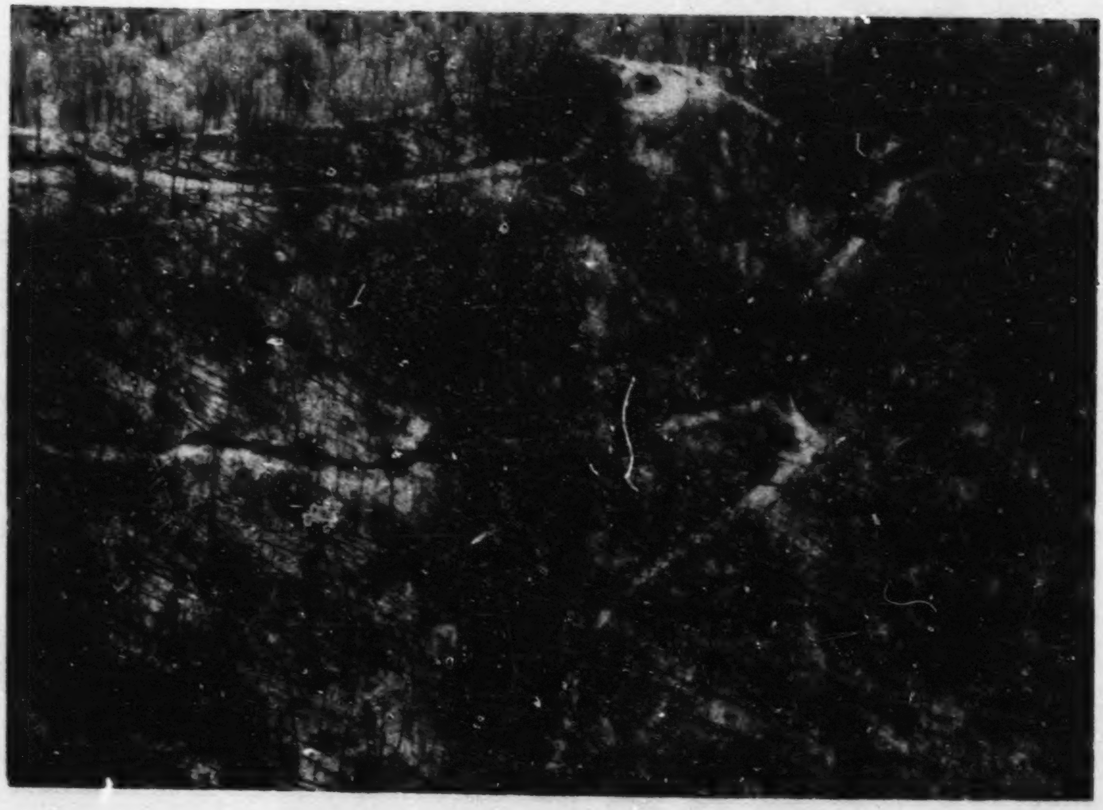


Figure 8.—Logged area in Tug Fork basin.

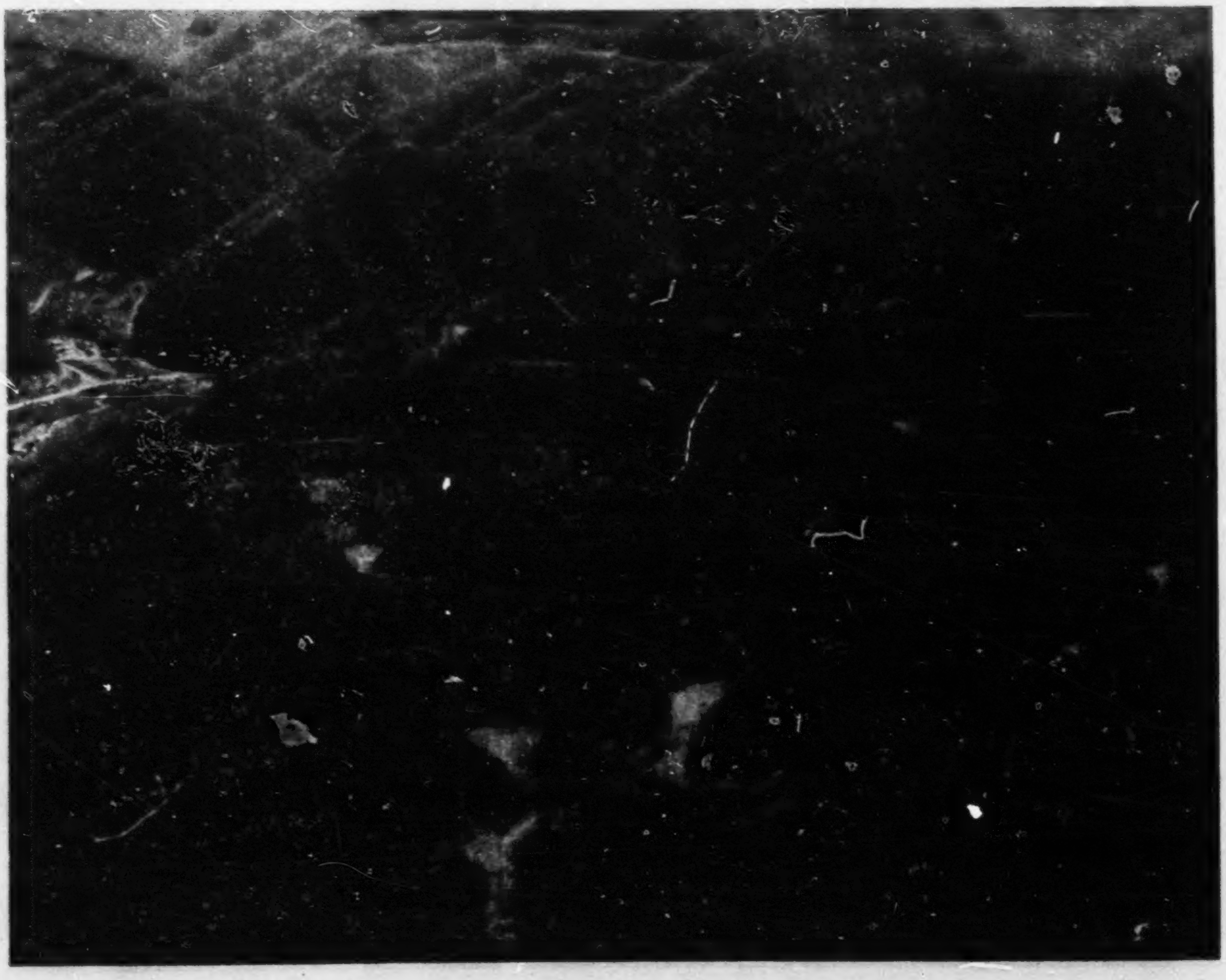


Figure 9.—Surface-mined area in Tug Fork basin.

Recent land-use mapping (U.S. Geological Survey, 1976, 1978a, and 1978b) identified the following land use and cover categories within the basin:

Urban or Built-up

Residential
Commercial and services
Industrial
Mixed urban or built-up land

Agricultural

Cropland and pasture

Forest

Deciduous forest
Mixed forest

Water

Reservoirs

Barren

Strip mines, quarries, and gravel pits
Transitional areas

An explanation of these categories is contained in U.S. Geological Survey Professional Paper 964, "A Land Use and Land Cover Classification System for Use with Remote Sensor Data" (Anderson, 1976). Table 4 shows the area and percent of the total basin devoted to each of these land-use categories for the 1973-1976 period.

Table 4.--Land use in the Tug Fork basin for 1973-1976.
(From U.S. Army Corps of Engineers, 1979)

USGS Land Use Category	Acres[a]	% of Total
Urban or builtup land	34,099	3.4
Crop and pasture land	5,325	0.5
Deciduous forest	907,930	91.6
Mixed forest	9,523	1.0
Reservoirs	307	b
Strip mines, quarries, and gravel pits	25,702	2.6
Transitional areas	9,114	.9
Total	992,000	100.0

[a] Figures are estimates using an areagraph chart which has 97% accuracy

[b] Less than .1%

The largest single classification in the basin is "deciduous forest." However it should be noted that areas of streams and canals are not included and areas of strip mining may be underestimated because of mapping limitations. Only waterways of over 660 feet in width and over 10 acres in extent are identified. Also, the areal extent of surface mining determined from these maps may not reflect the total area of surface disturbance due to mining because only mines that have widths greater than 660 feet and cover areas greater than 10 acres are mapped.

Appendix plate C-1 shows the distribution of the above categories of land use in the Tug Fork basin on the basis of 1973-1976 aerial photography.

PROJECT DESCRIPTION

In January 1980, the U.S. Geological Survey began a 5-year investigation of the relation between changes in land uses since 1950 and flooding in the Big Sandy River basin. The emphasis of this project will be on the Tug Fork. The project is a cooperative effort between the Geological Survey, U.S. Bureau of Mines, and the Office of Surface Mining, Reclamation, and Enforcement.

Objectives

The objectives of this project are as follows:

1. To define the relative effect of various land-use changes on the surface-water flood hydrology of the Big Sandy River basin in West Virginia, Kentucky, and Virginia, with emphasis on the Tug Fork. The investigation will identify the changes in magnitude and timing of flood hydrographs and downstream areas of inundation resulting from various land-use changes that typically occur in the basin.

2. To assess the effectiveness of present mine-reclamation practices for controlling undesirable aspects of storm runoff. This assessment will be based upon long-term observation of stormflows at and downstream from various mined and unmined areas.

3. To observe and analyze the cumulative impacts of typical land-use changes on sediment and flow characteristics at downstream points in the Tug Fork basin. The goal is to obtain an adequate data base for a detailed interpretation leading to techniques for more reliably and acceptably predicting effects of future land use changes on both flow and sediment characteristics.

Approach

The approach to be followed will be:

1. Available data describing the hydrologic characteristics of the Tug Fork basin will be assembled and documented.

2. Available hydrologic data will be statistically analyzed to determine if hydrologic changes and/or trends have taken place in the Tug Fork basin in relation to land use changes over the past 30 years.

3. Hydrologic variables will be measured at 10 gage sites in the Tug Fork basin for a period of up to 5 years. These data will be published annually and will provide input for development and use of detailed, deterministic hydrologic models of the gaged drainages. These gaged sites will continuously measure hydrologic variables on small drainage areas representing, as nearly as possible, the following single land uses characteristics:

   a. Surface mining practices prior to 1968

   b. Surface mining practices of 1968-1977

   c. Haulback operations complying with current Federal regulations

   d. Mountaintop operations complying with current Federal regulations

   e. Natural conditions

   At each site, precipitation, streamflow, air temperature, and suspended sediment will be continuously measured.

4. An operational hydrologic computer-model of the Tug Fork basin will be constructed. After 2 years of data have been collected and again after 5 years, the model will be used to define the effects of changed land use on streamflow characteristics. These analyses will utilize a detailed deterministic model and shall consider the effects of land use changes on flood magnitudes, flood profiles, hydrograph characteristics, and sediment loads.

Schedule of Work

This project was started in January 1980 and is scheduled for completion in March 1985. A detailed schedule of work for the project is shown in figure 10.

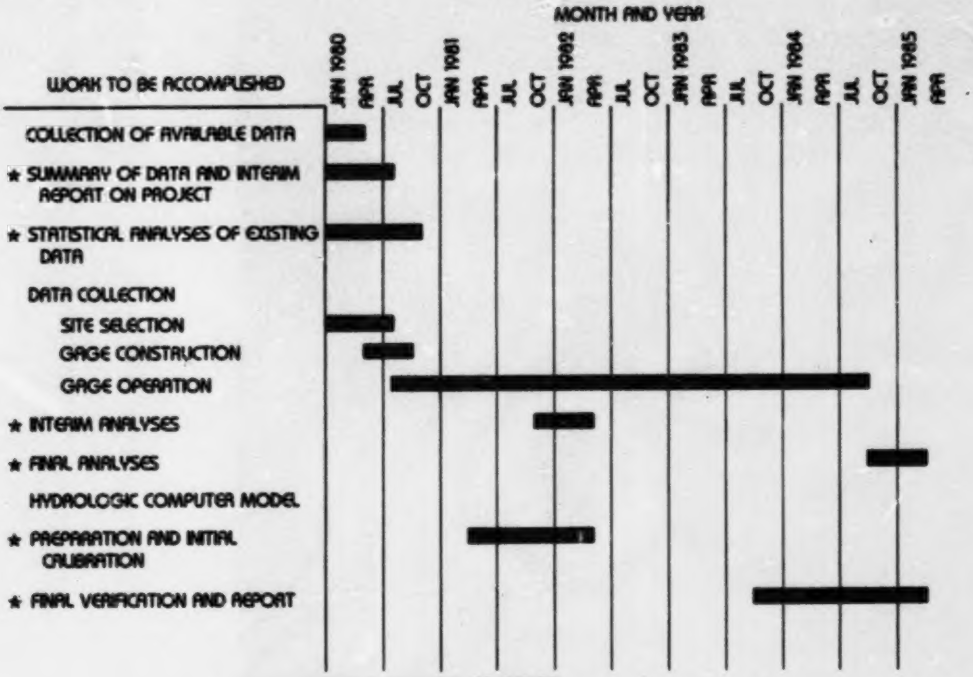


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Figure 10.—Schedule of work for Tug Fork basin investigation.

Analysis of Available Data

Existing long-term streamflow data, in and adjacent to the basin, will be statistically analyzed to determine if trends or changes in the flooding characteristics have taken place with time. There are only three gaging stations in the Tug Fork basin with 30 or more years of record—stations 03213000, Tug Fork at Litwar, West Virginia; 03213500, Panther Creek near Panther, West Virginia; and 03214000, Tug Fork near Kermit, West Virginia. In order to obtain a larger sample of flood records, data from several stations, listed in the following table, in the adjacent Levisa Fork basin will also be included in these analyses. This basin is nearby and hydrologically and historically similar to the Tug Fork basin.

Table 5.—Streamflow stations to be used in the statistical analyses.

Number	Name	Period of Record
03207500	Levisa Fork near Grundy, Virginia	1941-
03208500	Russell Fork at Haysi, Virginia	1926-
03210000	Johns Creek near Meta, Kentucky	1941-
03212000	Paint Creek at Staffordsville, Kentucky	1950-
03213000	Tug Fork at Litwar, West Virginia	1930-
03213500	Panther Creek near Panther, West Virginia	1946-
03214000	Tug Fork near Kermit, West Virginia	1934-

The analysis of flood records will include the following approaches:

1. The seven stations listed in table 5 have annual flow records of 30 years or more. For each of these stations, several nonparametric statistical methods will be employed to test the hypothesis that the probability distribution of annual floods has changed over the period of record. These techniques will include Kendall's tau (Kendall, 1975), the Mann-Whitney rank-sum test (Bradley, 1968, p. 113), and the two-sample Smirnov test (Bradley, 1968, p. 288).

2. For the three gages located in the Tug Fork basin and mentioned above, the partial-duration-series record will be examined and an attempt made to characterize the joint stochastic process of times between exceedances of discharges above a base level and the magnitude of the exceedances. The mathematical model proposed by Shane and Lynn (1964) will be applied or modified for use if necessary. The hypothesis that the parameters of the process are changing as a function of time, land use, or coal extraction will then be explored statistically. The goal of the examination will be to develop a statistical relationship, station-by-station, relating frequency and magnitude of flooding to land use in general. The work will be dependent on the availability of time-series land-use data for the basin.

3. For each of the three gages in the Tug Fork basin, a multiple-regression model will be defined relating annual peak discharge (dependent variable) to rainfall intensity and time as measured in years (independent variables) at various rainfall stations and for various rainfall durations (explanatory variables). The presence of time as a significant variable in the fitted model will serve as an indicator of trends or changes over time in the rainfall-peak runoff relationship.

4. The relation between river stage and discharge will be analyzed for the three sites located in the Tug Fork basin. These analyses will be used to determine if changes in the relationship of stage to discharge have taken place with time. These analyses may identify trends in the aggregation or degradation of the river channel at these sites that in turn could be indicative of increased or decreased sedimentation in the river system.

Data Collection

As discussed in item 3 of the approach, 10 gaging stations will be installed in the basin to collect hydrologic data on small single land-use basins. These stations will provide continuous measurements of water discharge, suspended-sediment discharge, precipitation, and air temperature. Figure 11 is a photograph showing a typical gage installation on one of these streams. The locations of these sites are shown in figure 12. Station number, name, drainage area, location, and predominant type of land use at these sites are shown in table 6.

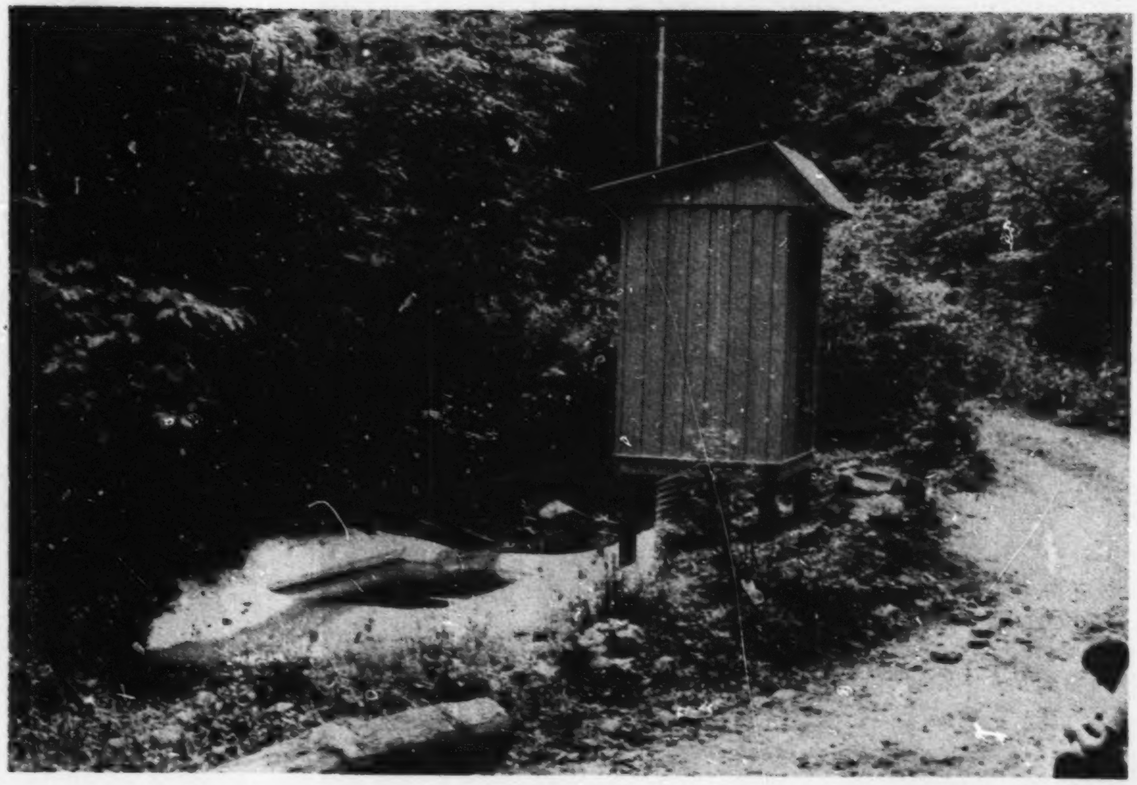

Figure 11.—Typical small-area gaging station. (Station 03212703, Elkhorn Creek Tributary at Welch, West Virginia.)

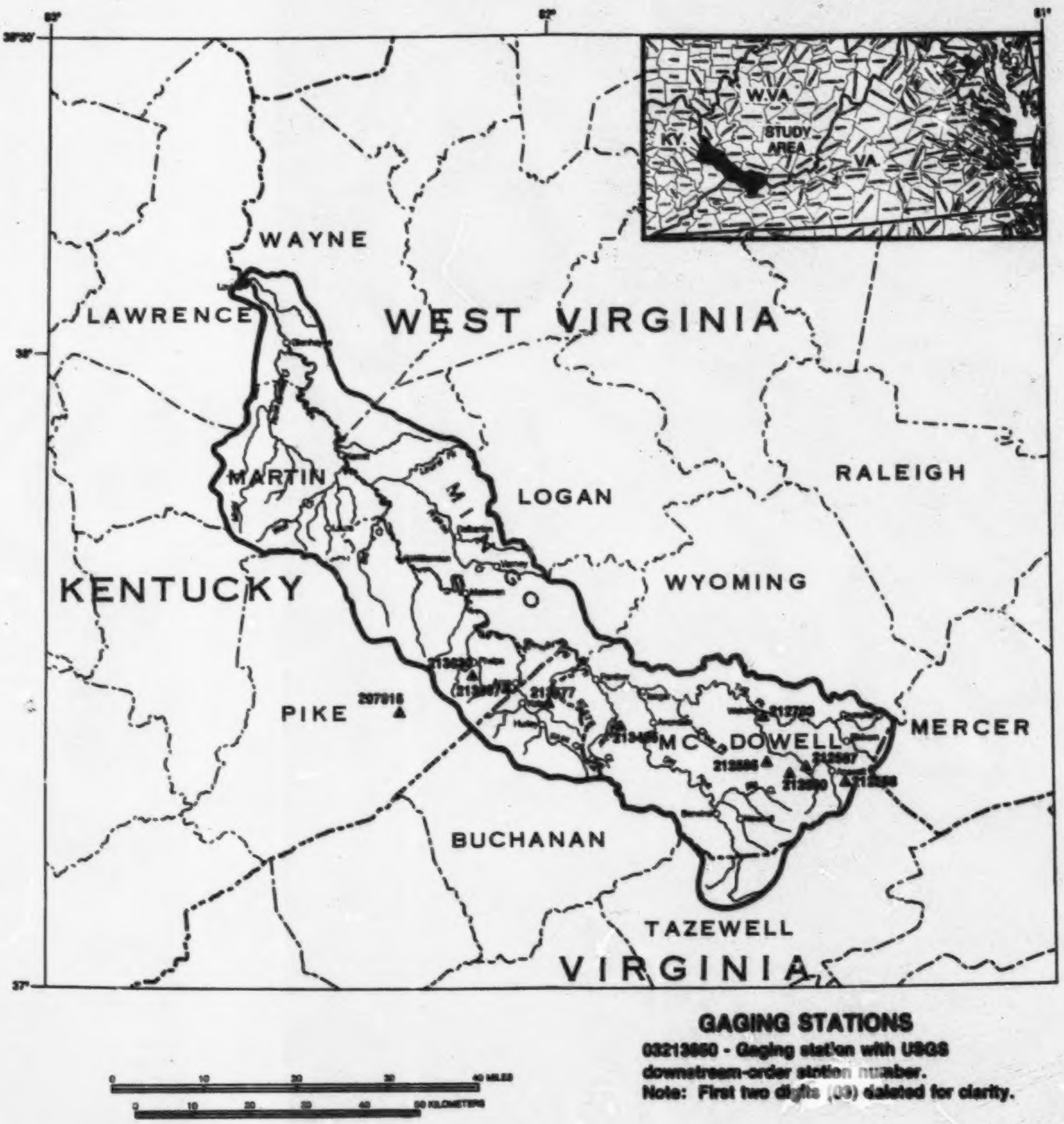

Figure 12.—Stream-gaging stations on small single land-use areas.

Table 6.—Small-basin gaging stations for Tug Fork Project.

Station Number		Drainage Area (mi²)	Location	Predominant Land Use
03213630	Right Fork Hurricane Creek near Stopover, KY	0.82	Lat 37°29'46", long 82°05'22", Pike County, on left bank about 200 ft upstream from confluence with Left Fork Hurricane Creek and about 2.3 mi south of Stopover	Surface mining prior to 1968
03212558	Puncheoncamp Branch at Leckie, WV	1.36	Lat 37°20'37", long 81°24'42", McDowell County, on right bank 1500 ft upstream from mouth at Leckie	Surface mining prior to 1968
03212580	Left Fork Sandlick Creek at Elbert, WV	1.78	Lat 37°20'08", long 81°31'39", McDowell County, on right bank, 0.7 mile east of Elbert	Surface mining between 1968 and 1977
03213577	Pumpkin Branch near Hurley, VA	.60	Lat 37°21'01", long 82°00'40", Buchanan County, on left bank near last residence on private road, 0.5 mile upstream from mouth and 2.1 miles north of Hurley	Surface mining between 1968 and 1977
03212594	Camp Creek near Argo, KY	1.60	Lat 37°28'29", long 82°05'16", Pike County, on left bank about 1.4 miles upstream from mouth on Knox Creek and 1.4 miles west of Argo	Current haulback mining
03207915	Elkfoot Branch near Nigh, KY	0.73	Lat 37°23'52", long 82°17'03", Pike County, on right bank 0.3 mile upstream from mouth on Levisa Fork and about 2 miles southwest of Nigh	Current haulback mining
03212703	Elkhorn Creek Tributary at Welch, WV	.66	Lat 37°25'46", long 81°34'02", McDowell County, on left bank about 0.1 mile southeast of Stevens clinic hospital in Welch	Current mountain top mining
03212567	Freemans Branch near Skygusty, WV	.30	Lat 37°16'28", long 81°29'15", McDowell County, 0.2 mi upstream from mouth, 0.5 mile north of Monson and 3.5 miles south of Skygusty	Current mountain top mining
03212585	Right Fork Sandlick Creek near Gary, WV	1.21	Lat 37°20'51", long 81°34'01", McDowell County, on left bank 1.3 miles upstream from mouth and 1.5 miles southeast of Gary	Natural basin
03213495	Crane Creek near Panther, WV	.54	Lat 37°25'28", long 81°41'39", McDowell County, on left bank 200 ft upstream from mouth, about 4.3 miles southwest of Panther	Natural basin

After 2 years of data collection, and again after 5 years, the data from these stations will be analyzed to develop runoff parameters and hydrograph characteristics such as peak and base flows, storm runoff discharges, sediment loads, basin lag-time and time-of-concentration. These characteristics from sites representing various categories of mining will be compared to characteristics representative of other land uses in the basin. The analyses should provide an assessment of the relative effects, on runoff characteristics, of mining as compared to other land uses.

Determination of Land Use

The analytical plan is dependent on the ability to quantify land uses for various time periods. The period from 1950 to 1980 was chosen for this project as probably the most significant time of change in the basin.

Aerial photography of the entire basin is available from various sources for the 1950 through 1953, 1960, 1973 through 1976, and 1980 time periods. This photography will be source material for determination of land-use data representative of 1950, 1960, 1975, and 1980.

For each of the four dates, the Geological Survey will prepare maps of selected land uses and subsequently measure and tabulate the area of each category above each point of interest in the basin. The proposed types of land uses to be delineated and the minimum areas of each to be considered are shown in the following table:

Table 7.--Land uses to be delineated and minimum areas considered.

Land Use	Minimum Area
Surface Mining a. Active b. Inactive c. Reclaimed	No minimum - Mapped or shown linearly with width of feature noted.
Other Mining Activities (including tipple areas, storage areas, processing areas, and waste piles)	300-foot width and/or 10 acres
Urban	300-foot width and/or 10 acres
Cut Forest	40 acres
Agriculture	10 acres
Ponds and Catchments	5 acre - all others shown as dots
Roads and Highways a. Surfaced b. Unsurfaced	Shown linearly with widths noted

Hydrologic Computer Model

A digital model describing the flood hydrology and hydraulics of the Tug Fork will be prepared. The purpose of the model will be to provide comparable, synthetic flood discharges and flood elevations at about nine selected gaged and ungaged points in the basin. These data should be representative of conditions existing in the basin at various time periods since 1950. These results and concurrent land-use information will be statistically analyzed to assess the effects of various land uses on flood hydrology.

The model will be calibrated using recorded flow and rainfall events that occurred during 1950-60, 1960-75, and 1975-80.

The model, as calibrated for each of these time periods, will be used with a standardized set of climatic inputs to provide a synthetic record of floods that are representative of the flood hydrology for the specific period. The differences in flood characteristics at each point of interest along with corresponding changes in land use will then be analyzed to determine if changes in flooding can be related to changes in land use.

RELATED INVESTIGATIONS

Because of the interest in environmental problems associated with development in the Appalachian region, several studies by various agencies have been planned or are underway. Some of the data collected for these studies will augment the data collected for this project. A brief summary of some of these investigations follows:

U.S. Geological Survey

The Geological Survey is responsible for the following related investigations:

1. A network of stream-gaging stations throughout the Appalachian coal region to obtain data on stream quantity and quality. This "coal hydrology" network consists of two types of stations: (1) continuous-record gaging stations, and (2) synoptic, partial-record sites. Data on the synoptic sites are observed only during selected periods of high, median, and low flows. The location of these sites in the Tug Fork basin are shown in appendix B. Station numbers, drainage areas, locations, and types of data collected at these sites are also in appendix B.

2. A study of the effects of surface mining on the hydrology of Beaver Creek basin, McCreary County, Kentucky, was started in 1955 as a cooperative effort between the Geological Survey and several State and other Federal agencies. A hydrologic comparison between two tributary basins, one mined and one unmined, was made to determine the impact on rainfall-runoff relations (Collier, and others, 1970). The mine drainage had

greater peak flows per square mile of drainage area and more rapid changes in discharge, but the undisturbed basin had greater base flows. Lack of data for the mined area prior to mining prohibited separation of differences in the runoff characteristics between the two basins into those due to surface mining and those caused by natural differences. Although this study was of a much narrower scope than the Tug Fork investigation, it should provide some applicable information.

3. An investigation of the sediment yield from surface-mined and unmined areas in the drainage basins above Fishtrap and Dewey Lakes, Kentucky, was made by the Geological Survey in cooperation with the U.S. Army Corps of Engineers. The area is located in the southern portion of the Levisa Fork basin. The study was completed and results published in a report by Curtis, Flint, and George (1978). Sediment yields ranged from 2,890 to 21,000 tons per square mile for study areas where surface-mining techniques predominated, and from 732 to 3,470 tons per square mile where underground-mining methods predominated.

4. Another study currently underway is a project to define the impact of surface mining on water quality in the New River basin of Tennessee (Carey, 1979). This project is being conducted in cooperation with various State and Federal agencies and is scheduled to be completed in September 1980. The primary objective of the investigation is to determine the effect of coal mining on water quality, sediment production (including bed-load), and streamflow in the New River basin of Tennessee.

U.S. Forest Service

The U.S. Forest Service, Northeastern Forest Experimental Station, has collected streamflow and sediment data at mined and unmined drainage basins in Breathitt County, Kentucky, and Raleigh County, West Virginia, since about 1967. The objective is to evaluate the effects of surface mining on the water resources of small Appalachian watersheds. None of these gaged watersheds are located in the Tug Fork basin. Preliminary results to date have been inconclusive. Curtis (1972) stated, "Peak flow rates increased by a factor of 3 to 5 after surface mining," but subsequently (Curtis, 1977) reported, "* * * streamflow from surfaced-mined watersheds peaked lower than that from adjacent or nearby unmined watersheds."

U.S. Army Corps of Engineers

The Huntington District of the U.S. Army Corps of Engineers is preparing a flood plan for the Tug Fork basin. A draft of the flood plan is scheduled to be available by late summer 1980. The investigation will weigh alternative methods of flood protection for the basin. It will include analysis of current hydraulic and hydrologic information about the Tug Fork River system. Much of these data, including river cross sections, historic flood profiles and flood-plain mapping, will augment the data to be collected in this project.

SUMMARY

A plan has been established for studying the impacts of land-use changes on flood and sediment characteristics of the Tug Fork basin. The plan includes three significant activities:

1. Statistical analyses of available data will attempt to identify if changes or trends in flood frequency and magnitude have taken place with time. If so, an attempt will be made to relate the changes to changes in land use. The analyses will also address in a general way the changes in sediment deposition.

2. Detailed climatic and hydrologic data collected in 10 small, single land-use drainage areas will be used to calibrate deterministic computer models of the rainfall-runoff-sediment process. These data and models will establish differences in streamflow characteristics from the various land uses.

3. A basin-wide computer model will evaluate the cumulative impacts of the various land uses on streamflow and sediment characteristics. This model will provide the means of assessing the overall effects of previous land-use changes throughout the basin and also will provide a means for predicting river behavior resulting from possible future land-use change.

Collection of the detailed climatic and hydrologic data on small, single land-use drainage areas has begun at eight sites and is expected to begin at two additional sites in the immediate future.

Available information and available climatic and hydrologic data have been accumulated from many sources. Compiled and presented in this report are: hourly precipitation for selected days and annual-maximum daily precipitation for nine sites, annual-maximum streamflow rates and stages for three stream-gaging sites, hourly gage-height and discharge rates for selected storms at four stream-gaging sites, flood profile, flood-frequency relationships, and other streamflow information.

These data and analyses will form much of the basis for the statistical analyses to be performed and provide data for the calibration of hydrologic models.

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APPENDIX A

APPENDIX A

Climatologic Data

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Table A-1.—*Hourly precipitation for selected days at Burdine, Kentucky (station number 51120)*

Date	*Time*	*Precipitation in inches*
2–25–55	. . .	0
2–26–55	1200	.03
	1300	.22
	1400	.03
	1500	.10
	1600	[a].05
	1700	[a].05
	1800	[a].05
	1900	[a].05
	2000	[a].05
	2100	[a].05
	2200	[a].05
	2300	[a].05
	2400	[a].06
2–27–55	0100	[a].03
	0200	[a].03
	0300	[a].03
	0400	[a].03
	0500	[a].03
	0600	[a].03
	0700	[a].03
	0800	[a].03
	0900	[a].03
	1000	[a].03
	1100	[a].03
	1200	[a].14
2–28–55	0500	.29
	0600	.26
	0700	.02
	0800	.14
	0900	.04
	1000	.11
	1100	.14
	1200	.15
	1300	.04
	1400	.01
	1500	.06
	1600	.01
3– 1–55	0100	.01
	0200	.01
	0300	.01
	0600	.03
	0700	.13
	0800	.19
	0900	.27
	1000	.06
3– 2–55	. . .	0
3– 3–55	0900	[a].07
	1000	[a].07
	1100	[a].07
	1200	[a].07
	1300	[a].09
3– 4–55	. . .	0
3– 5–55	0200	.43
	0300	[a].09
	1100	[a].05
	1400	[a].09
	1500	[a].09
	1600	[a].09
	1700	[a].09
	1800	[a].09
	1900	[a].13
3– 6–55	0100	[a].04
	0200	[a].04
	0300	[a].04
	0400	[a].04
	0500	[a].04
	0600	[a].04
	0700	[a].04
	0800	[a].04
	0900	[a].04
	1000	[a].04
	1100	[a].04
	1200	[a].14
1–27–57	0300	.03
	0400	.05
	0500	.04
	0600	.10
	0700	.05
	0800	.02
	0900	.04
	1000	.01
	1200	.01
	1300	.09
	1400	.06
	1500	.03
	1600	.05
	1700	.01
	1800	.01
	1900	.04
	2000	.03
1–27–57	2100	0.01
	2200	.04
	2300	.05
	2400	.01
1–28–57	0100	.05
	0200	.04
	0300	.04
	0400	.04
	0500	.05
	0600	.01
	0700	.01
	0800	.06
	0900	.06
	1000	.05
	1100	.02
	1200	.02
	1300	.06
	1400	.13
	1500	.02
	2100	.01
	2300	.03
	2400	.10
1–29–57	0100	.03
	0200	.14
	0300	.23
	0400	.56
	0500	.23
	0600	.25
	0700	.16
	0800	.30
	0900	.44
	1000	.16
	1100	.08
	1200	.02
	1300	.16
	1400	.13
	1500	.09
	1600	.01
	1800	.01
	1900	.09
1–30–57	2400	.01
1–31–57	0100	.01
	0200	.04
	0300	.02
	0400	.01
	0500	.02
	0800	.01
1–31–57	0900	0.06
	1000	.01
	1300	.01
	1400	.01
	1700	.01
	1800	.10
	1900	.10
	2000	.04
	2100	.06
5– 4–58	1300	.04
	1400	.03
	1500	.01
	1700	.02
	2400	.09
5– 5–58	0100	.07
	0200	.01
	0300	.01
	0800	.09
	0900	.08
	1200	.28
	1400	.01
	2000	.41
	2300	.05
	2400	.05
5– 6–58	0100	.07
	0200	.03
	0300	.05
	0400	.10
	0700	.02
	1400	.49
	1500	.08
	1600	.27
	1700	.25
	1800	.06
	1900	.05
	2000	.05
	2100	.04
	2200	.01
	2300	.06
	2400	.05
5– 7–58	0100	.07
	0200	.07
	0300	.12
	0400	.11
	0500	.11
	0600	.08

See footnote at end of table.

Table A-1.—*Hourly precipitation for selected days at Burdine, Kentucky (station number 51120)*—Continued

Date	*Time*	*Precipitation in inches*
5–7–58	0700	0.08
	0800	.02
	0900	.03
	1000	.02
	1100	.05
	1300	.03
	1400	.02
	1500	.03
	1600	.02
	1700	.03
	1800	.02
	1900	.01
5–8–58	...	0
5–9–58	...	0
3–10–63	...	0
3–11–63	0700	.09
	0800	.06
	0900	.22
	1000	.18
	1100	.10
	1200	.05
	1300	.07
	1400	.04
	1500	.11
	1600	.22
	1700	.11
	1800	.15
	1900	.10
	2000	.23
	2100	.25
	2200	.45
	2300	.32
	2400	.23
3–12–63	0100	.20
	0200	.25
	0300	.13
	0400	.04
3–13–63	...	0
3–14–63	...	0
3–15–63	...	0
3–5–67	1100	.03
	1200	.02
	1400	.01
	1500	.02
	2400	.01
3–6–67	0100	.01
	0200	.03
	0300	.16
	0400	.02
	0500	.14
	0600	.04
	0700	.08
	0800	.15
	0900	.11
	1000	.11
	1100	.08
	1200	.10
	1300	.02
	1400	.02
	1500	.01
	1600	.13
	1700	.10
	1800	.17
	1900	.40
	2000	.37
	2100	.26
	2200	.18
	2300	.33
	2400	.08
3–7–67	0100	.01
	0300	.01
	0400	.02
	0500	.02
	0600	.01
	0700	.04
3–8–67	...	0
3–9–67	...	0
2–24–72	0100	.02
	0200	.01
	0300	.01
	0500	.12
	0600	.28
	0700	.15
	0800	.15
	0900	.10
	1000	.15
	1200	.02
	1300	.08
	1400	.11
	1500	.05
	1600	.13
	1700	.02
	1800	.20
	1900	.08
	2000	.10
	2100	.06
2–25–72	1700	.02
2–26–72	0200	.15
	0300	.45
	0400	.07
	0500	.08
	0600	.02
	0700	.03
	0800	.20
	0900	.02
	1000	.13
	1600	.01
	1700	.04
2–27–72	...	0
2–28–72	...	0
2–29–72	...	0
3–1–72	1800	.03
	1900	.01
	2000	.01
3–2–72	1700	.09
	1800	.29
	1900	.10
	2000	.04
	2100	.01
4–2–77	...	0
4–3–77	2200	.60
	2300	.10
	2400	.10
4–4–77	2100	.10
	2200	.10
	2300	.10
	2400	.20
4–5–77	0100	.20
	0200	.30
	0300	.20
	0400	.20
	0500	.10
	0600	.20
	0700	.10
	1000	.20
	1100	.10
	1200	.20
	1300	.40
	1500	.20
	1600	.10
	1700	.20
	1800	.10
	1900	.10
	2000	.60
	2300	.10
4–6–77	1400	.10
	2000	.10
	2400	.10
4–7–77	0300	.10
4–8–77	...	0
4–9–77	...	0

---

[a] Estimated.

Table A-2.—*Hourly precipitation for selected days at Davella, Kentucky (station number 52053)*

Date	*Time*	*Precipitation in inches*
2–25–55	. . .	0
2–26–55	1100	.01
	1200	.07
	1300	.03
	1400	.10
	1500	.05
	1700	.01
	1800	.04
	1900	.07
	2000	.03
	2100	.05
	2200	.15
	2300	.05
2–27–55	0100	.05
	0200	.05
	0300	.06
	0400	.01
	0500	.20
	0600	.43
	0700	.15
	0800	.15
	0900	.03
	1000	.02
	2300	.04
	2400	.03
2–28–55	0200	.20
	0300	.10
	0400	.20
	0500	.13
	0800	.16
	0900	.01
	1000	.13
	1100	.12
	1200	.05
3– 1–55	0500	.07
	0600	.33
	0700	.26
	0800	.16
	0900	.07
	1000	.02
	1100	.01
3– 2–55	. . .	0
3– 3–55	0900	0.03
	1100	.03
	1200	.02
3– 4–55	0900	.37
	1000	.10
	1100	.03
	1200	.10
	1300	.05
	1500	.05
	2300	.50
	2400	.27
3– 5–55	0500	.43
	0600	.07
	1000	.03
	1600	.20
	1700	.02
	2100	.53
	2400	.01
3– 6–55	0700	.29
	0800	.15
	0900	.17
	1000	.08
	1100	.02
	1200	.03
	1300	.02
	1800	.03
1–27–57	0400	.01
	0500	.03
	0600	.06
	0800	.01
	0900	.08
	1000	.03
	1100	.01
	1300	.01
	1400	.01
	1700	.01
	1900	.01
	2200	.01
	2300	.01
	2400	.07
1–28–57	0100	.14
	0200	.05
1–28–57	0300	0.03
	0400	.05
	0500	.05
	0600	.04
	0700	.07
	0800	.06
	0900	.04
	1000	.04
	1100	.05
	1200	.07
	1300	.14
	1400	.04
	1500	.02
	1900	.01
	2000	.03
	2100	.01
	2400	.02
1–29–57	0100	.03
	0200	.09
	0300	.01
	0400	.04
	0500	.16
	0600	.18
	0700	.12
	0800	.12
	0900	.22
	1000	.08
	1100	.07
	1200	.05
	1300	.08
	1400	.09
	1500	.02
	1600	.07
1–30–57	. . .	0
1–31–57	0100	.05
	0200	.02
	0400	.04
	0600	.06
	1000	.01
	1200	.01
	1500	.05
	1600	.05
	1700	.05
	1800	.01
	1900	.01
5– 4–58	1200	0.03
	1300	.06
	1500	.01
	1700	.01
	2000	.01
	2100	.01
	2300	.01
5– 5–58	0100	.31
	0200	.07
	0300	.01
	0800	.03
	0900	.05
	1000	.04
	1100	.01
	1900	.01
	2100	.03
	2400	.01
5– 6–58	0100	.08
	0200	.01
	0300	.01
	0400	.05
	0500	.05
	0600	.02
	0700	.01
	1000	.01
	1100	.01
	1200	.04
	1300	.06
	1400	.02
	1500	.10
	1600	.02
	1700	.06
	1800	.03
	1900	.05
	2000	.08
	2100	.07
	2200	.06
	2300	.13
	2400	.08
5– 7–58	0100	.06
	0200	.10
	0300	.08
	0400	.03
	0500	.12

Table A-2.—*Hourly precipitation for selected days at Davella, Kentucky (station number 52053)*—Continued

Date	*Time*	*Precipitation in inches*
5– 7–58	0600	0.13
	0700	.08
	0800	.02
	0900	.06
	1000	.07
	1100	.03
	1200	.02
	1400	.02
	1600	.01
	1700	.01
	1800	.01
	1900	.01
5– 8–58	...	0
5– 9–58	...	0
3–10–63	...	0
3–11–63	0700	.02
	0800	.15
	0900	.10
	1000	.04
	1100	.03
	1200	.27
	1300	.28
	1400	.21
	1500	.21
	1600	.09
	1700	.17
	1800	.06
	1900	.14
	2000	.12
	2100	.28
	2200	.29
	2300	.10
	2400	.01
3–12–63	...	0
3–13–63	...	0
3–14–63	...	0
3–15–63	...	0
3– 5–67	1400	.03
	2000	.02
3– 5–67	2100	0.01
	2400	.02
3– 6–67	0100	.03
	0200	.01
	0300	.03
	0400	.35
	0500	.25
	0600	.04
	0700	.10
	0800	.09
	0900	.10
	1000	.11
	1100	.05
	1200	.03
	1300	.01
	1400	.02
	1500	.17
	1600	.15
	1700	.05
	1800	.34
	1900	.41
	2000	.25
	2100	.10
	2200	.17
	2300	.21
	2400	.12
3– 7–67	0100	.01
	0200	.01
	0300	[a].01
	0400	[a].01
	0500	[a].01
	0600	[a].01
	0700	[a].01
	0800	[a].01
	0900	[a].01
	1000	[a].07
3– 8–67	...	0
3– 9–67	...	0
2–24–72	0100	[a].02
	0200	[a].02
	0300	[a].02
	0400	[a].02
	0500	[a].02
2–24–72	0600	[a]0.02
	0700	[a].02
	0800	[a].02
	0900	[a].03
	1500	.04
	1600	.11
	1700	.15
	1800	.19
	1900	.10
	2000	.06
2–25–72	2000	.13
	2100	.42
	2200	.15
	2300	.06
	2400	.14
2–26–72	0100	.16
	0200	.04
	0300	.09
	0400	.12
	0500	.03
	0600	.02
	0700	.04
	0900	.01
	1000	.01
	1100	.03
2–27–72	...	0
2–28–72	...	0
2–29–72	...	0
3– 1–72	...	0
3– 2–72	1100	.07
	1200	.17
	1300	.11
	1400	.05
	1700	.17
	1800	.08
	1900	.11
	2000	.04
	2100	.01
	2200	.03
	2300	.05
	2400	.01
1– 9–74	0100	0.06
	0200	.08
	0300	.17
1–10–74	0100	.02
	0200	.02
	0300	.21
	0400	.15
	0500	.17
	0600	.28
	0700	.60
	0800	.15
	0900	.14
	1000	.06
	1100	.01
	1200	.06
	1300	.03
	1600	.03
	1700	.06
	1800	.05
	1900	.11
	2200	.02
	2300	.07
	2400	.13
1–11–74	0100	.03
	0200	.05
	0300	.04
	0400	.11
	0500	.09
	0600	.05
	0700	.06
	0800	.05
	0900	.01
1–12–74	...	0
1–13–74	...	0
1–14–74	...	0
4– 2–77	2000	.15
	2100	.20
4– 3–77	2200	.03
	2300	.08
	2400	.09

See footnote at end of table.

Table A-2.—*Hourly precipitation for selected days at Davella, Kentucky (station number 52053)*—Continued

Date	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*
4– 4–77	0100	0.09	4– 4–77	0900	0.01	4– 4–77	1800	0.34	4– 6–77	...	0
	0200	.16		1100	.06		1900	.37			
	0300	.10		1200	.10		2000	.18	4– 7–77	...	0
	0400	.05		1300	.17		2100	.02	4– 8–77	...	0
	0500	.03		1400	.15		2200	.12			
	0600	.06		1500	.11				4– 9–77	...	0
	0700	.06		1600	.07	4– 5–77	0300	.01			
	0800	.03		1700	.09		1200	.02	4–10–77	...	0

[a] Estimated.

Table A-3.—*Hourly precipitation for selected days for Louisa, Kentucky (station number 54946)*

Date	*Time*	*Precipitation in inches*
2–25–55	...	0
2–26–55	1200	.10
	1300	.02
	1400	.01
	1700	.01
	1800	.04
	1900	.02
	2000	.02
	2100	.07
	2200	.06
	2300	.04
	2400	.01
2–27–55	0100	.09
	0200	.01
	0400	.01
	0500	.15
	0600	.26
	0700	.11
	0800	.07
2–28–55	0400	.04
	0600	.01
	0800	.11
	0900	.20
	1000	.31
	1100	.11
	1800	.09
	1900	.05
3–1–55	0600	.17
	0700	.25
	0800	.12
	0900	.01
3–2–55	...	0
3–3–55	0900	.02
	1000	.06
	1100	.01
	1200	.04
	1300	.09
	1400	.07
	1500	.01
3–4–55	0800	.03
	0900	.02
3–4–55	1000	0.01
	1400	.02
	1500	.11
	2200	.10
	2300	.05
	2400	.09
3–5–55	0100	.40
	0200	.09
	0300	.16
	0400	.35
	0500	.10
	0600	.10
	1600	.35
	1700	.05
	2000	.23
3–6–55	0700	.29
	0800	.13
	0900	.10
	1000	.06
	1100	.06
	1200	.02
	1700	.01
	1800	.01
	1900	.01
1–27–57	2300	.01
	2400	.04
1–28–57	0100	.05
	0200	.06
	0300	.04
	0400	.04
	0500	.01
	0600	.01
	0700	.03
	0800	.05
	0900	.07
	1000	.11
	1100	.01
	1200	.02
	1300	.01
	1400	.01
	1800	.01
	2200	.01
	2300	.01
1–29–57	0100	0.02
	0200	.03
	0500	.02
	0600	.17
	0700	.29
	0800	.14
	0900	.13
	1000	.09
	1100	.07
	1200	.08
	1300	.01
	1400	.03
	1500	.02
1–30–57	...	0
1–31–57	0100	.05
	0200	.01
	0400	.01
	0500	.01
	0800	.01
	0900	.01
	1700	.01
	1800	.01
	2000	.01
	2100	.01
	2200	.01
5–4–58	1100	.11
	1200	.03
	1400	.01
	2000	.09
	2100	.14
5–5–58	0100	.01
	0200	.06
	0400	.01
	0500	.02
	0600	.02
	0700	.03
	0800	.01
	0900	.01
	1000	.04
	1200	.01
5–6–58	0100	.03
	0200	.02
	0300	.04
5–6–58	0400	0.01
	0500	.05
	0600	.01
	0700	.04
	1100	.01
	1200	.02
	1300	.09
	1400	.01
	1600	.07
	1700	.03
	1800	.06
	1900	.09
	2000	.03
	2100	.02
	2200	.09
	2300	.11
	2400	.09
5–7–58	0100	.06
	0200	.09
	0300	.09
	0400	.08
	0500	.09
	0600	.08
	0700	.04
	0800	.04
	0900	.02
	1000	.02
	1100	.02
	1200	.01
	1300	.04
	1400	.03
	1500	.04
	1600	.01
5–8–58	...	0
5–9–58	...	0
3–10–63	...	0
3–11–63	0800	.12
	0900	.07
	1000	.11
	1100	.13
	1200	.23
	1300	.23
	1400	.19

Table A-3.—*Hourly precipitation for selected days for Louisa, Kentucky (station number 54946)*—Continued

Date	Time	Precipitation in inches
3–11–63	1500	0.10
	1600	.01
	1700	.01
	1800	.03
	1900	.02
	2000	.14
	2100	.07
	2200	.24
	2300	.10
	2400	.03
3–12–63	. . .	0
3–13–63	. . .	0
3–14–63	. . .	0
3–15–63	. . .	0
3– 5–67	1100	.03
	1200	.02
	1300	.02
	1400	.02
	1700	.05
	1800	.07
	1900	.09
	2000	.18
	2100	.05
	2200	.19
	2300	.18
	2400	.03
3– 6–67	0100	.01
	0200	.03
	0300	.19
	0400	.30
	0500	.12
	0600	.06
	0700	.04
	0800	.11
	0900	.08
	1000	.11
	1100	.05
	1200	.03
	1300	.04
	1400	.06
3– 6–77	1500	0.09
	1600	.13
	1700	.03
	1800	.17
	1900	.23
	2000	.13
	2100	.09
	2200	.14
	2300	.14
	2400	.03
3– 7–67	0100	.01
	0200	.03
	0300	.02
	0400	.03
	0500	.05
	0600	.01
	1000	.05
	1100	.02
	1200	.02
	1300	.01
3– 8–67	. . .	0
3– 9–67	. . .	0
2–24–72	0100	.16
	0200	.20
	0300	.10
	0400	.10
	0500	.02
	0600	.08
	0700	.01
	1300	.01
	1400	.02
	1500	.06
	1600	.10
	1700	.30
	1800	.12
	1900	.03
2–25–72	0600	.01
	1600	.01
	1800	.01
	1900	.06
	2000	.08
2–25–72	2100	0.26
	2200	.07
	2300	.05
	2400	.30
2–26–72	0100	.02
	0200	.18
	0300	.10
	0400	.05
	1200	.01
	1300	.02
	1400	.02
2–27–72	. . .	0
2–28–72	. . .	0
2–29–72	. . .	0
3– 1–72	. . .	0
3– 2–72	1100	.11
	1200	.14
	1300	.15
	1400	.08
	1500	.17
	1600	.22
	1700	.08
	1800	.06
	1900	.13
	2000	.02
	2100	.02
	2200	.01
	2300	.01
	2400	.01
1– 9–74	0100	.10
	0200	.10
	0700	.10
1–10–74	0500	.20
	0600	.30
	0700	.30
	0800	.30
	0900	.20
	1100	.10
1–10–74	1200	0.10
	1300	.10
	1400	.10
	1500	.10
	1900	.10
	2100	.10
	2200	.10
1–11–74	0100	0.20
	0500	.10
	0600	.10
	0900	.10
1–12–74	. . .	0
1–13–74	. . .	0
1–14–74	. . .	0
4– 2–77	2000	.30
	2100	.10
4– 3–77	2300	.10
4– 4–77	0300	.10
	0500	.20
	0600	.10
	0700	.10
	1300	.20
	1400	.10
	1600	.10
	1700	.10
	1800	.30
	1900	.30
	2100	.10
	2200	.10
4– 5–77	. . .	0
4– 6–77	. . .	0
4– 7–77	2400	.10
4– 8–77	. . .	0
4– 9–77	. . .	0
4–10–77	. . .	0

Table A-4.—*Hourly precipitation for selected days at Pikeville, Kentucky (station number 56353)*

Date	*Time*	*Precipitation in inches*
2–25–55	. . .	0
2–26–55	1400	.07
	1500	.04
	1600	.10
	1700	.13
	1800	.31
	1900	.12
	2000	.13
	2100	.10
	2200	.13
	2300	.11
	2400	.09
2–27–55	0100	.01
	0200	.03
	0300	.06
	0400	.14
	0500	.08
	0700	.15
	0800	.40
	0900	.26
	1000	.14
	1200	.01
2–28–55	0200	.06
	0300	.12
	0400	.05
	0500	.35
	0600	.12
	0700	.24
	0800	.04
	0900	.01
	1000	.14
	1100	.05
	1200	.25
	1300	.15
	1400	.09
	1900	.02
3– 1–55	0600	.05
	0700	.45
	0800	.10
	0900	.04
3– 2–55	. . .	0
3– 3–55	1100	0.03
	1200	.03
	1300	.06
3– 4–55	2400	.17
3– 5–55	0100	.25
	0200	.05
	0300	.01
	0600	.15
	0700	.01
	1400	.06
	1500	.01
	1600	.16
	1700	.17
3– 6–55	0200	.17
	0300	.08
	0400	.25
	0500	.02
	0600	.08
	0700	.17
	0800	.21
	0900	.17
	1000	.07
	1100	.05
	1200	.06
1–27–57	0300	.01
	0400	.02
	0500	.02
	0600	.06
	0700	.06
	0800	.01
	0900	.01
	1000	.02
	1200	.01
	1300	.05
	1400	.04
	1600	.04
	1700	.01
	1900	.04
	2000	.02
	2100	.04
	2200	.01
	2300	.03
	2400	.06
1–28–57	0100	0.09
	0200	.06
	0300	.01
	0400	.04
	0500	.09
	0600	.03
	0700	.03
	1000	.01
	1100	.01
	1200	.10
	1300	.13
	1400	.22
	1500	.03
	1600	.01
	2100	.03
	2400	.05
1–29–57	0100	.01
	0200	.10
	0300	.04
	0400	.30
	0500	.21
	0600	.16
	0700	.11
	0800	.17
	0900	.15
	1000	.20
	1100	.05
	1200	.02
	1300	.11
	1400	.13
	1500	.08
	1600	.03
	1700	.01
	1800	.01
1–30–57	2400	.02
1–31–57	0100	.05
	0200	.04
	0300	.01
	0400	.01
	0500	.01
	1100	.02
	1200	.01
	1400	.01
1–31–57	1500	.01
	1600	.02
	1700	.11
	1800	.06
	1900	.03
	2000	.01
	2300	.02
	2400	.01
5– 4–58	0900	.01
	1000	.01
	1200	.01
	1300	.17
	2300	.02
5– 5–58	0100	.06
	0200	.01
	0700	.01
	0800	.03
	0900	.31
	1000	.05
	1100	.18
	1200	.02
	2000	.15
	2100	.01
	2400	.08
5– 6–58	0100	.05
	0200	.01
	0300	.01
	0400	.04
	0500	.04
	0600	.01
	1300	.01
	1400	.05
	1500	.18
	1600	.01
	1700	.20
	1800	.13
	1900	.03
	2000	.04
	2100	.04
	2200	.07
	2300	.04
	2400	.10
5– 7–58	0100	.06
	0200	.07

Table A-4.—*Hourly precipitation for selected days at Pikeville, Kentucky (station number 56353)*—Continued

Date	*Time*	*Precipitation in inches*
5– 7–58	0300	0.07
	0400	.09
	0500	.11
	0600	.05
	0700	.02
	0800	.06
	0900	.03
	1000	.03
	1100	.01
	1200	.03
	1300	.01
	1400	.01
	1500	.02
	1700	.02
	1800	.01
5– 8–58	...	0
3–10–63	...	0
3–11–63	0700	.04
	0800	.10
	0900	.09
	1000	.06
	1100	.14
	1200	.10
	1300	.16
	1400	.05
	1500	.15
	1600	.41
	1700	.47
	1800	.20
	1900	.15
	2000	.28
	2100	.33
	2200	.58
	2300	.24
	2400	.02
3–12–63	0100	.03
	0200	.10
	0300	.03
	0400	.02
3–13–63	...	0
3–14–63	...	0
3–15–63	...	0
3– 5–67	1300	0.01
	1400	.08
	1500	.01
	1600	.04
	1700	.01
3– 6–67	0200	.01
	0300	.07
	0400	.02
	0500	.40
	0600	.10
	0700	.05
	0800	.09
	0900	.11
	1000	.07
	1100	.08
	1200	.02
	1300	.02
	1400	.02
	1500	.03
	1600	.08
	1700	.04
	1800	.30
	1900	.45
	2000	.34
	2100	.13
	2200	.12
	2300	.26
	2400	.01
3– 7–67	0100	.01
	0200	.02
	0300	.01
	0400	.03
	0500	.02
	0600	.03
	0700	.01
3– 8–67	...	0
3– 9–67	...	0
3–24–72	0100	.01
	0200	.03
	0300	.30
	0400	.47
	0500	.40
	0600	.20
	0700	.30
2–24–72	0800	0.68
	0900	.08
	1500	.11
	1600	.16
	1700	.08
	1800	.18
	1900	.19
	2000	.10
2–25–72	2200	.10
	2300	.60
	2400	.16
2–26–72	0100	.38
	0200	.29
	0300	.21
	0400	.40
	0500	.04
	0600	.02
	0700	.09
	0800	.11
	0900	.04
	1000	.01
2–27–72	...	0
2–28–72	...	0
2–29–72	...	0
3– 1–72	...	0
3– 2–72	1000	.01
	1100	.05
	1200	.03
	1300	.01
	1700	.18
	1800	.31
	1900	.12
	2000	.05
	2200	.01
	2300	.02
	2400	.01
1– 9–74	0100	.08
	0200	.02
	0300	.33
	0400	.05
	0500	.02
1– 9–74	0600	0.01
	0700	.03
1–10–74	0200	.01
	0300	.48
	0400	.48
	0500	.06
	0600	.16
	0700	.11
	0800	.64
	0900	.86
	1000	.31
	1100	.04
	1200	.10
	1300	.03
	1400	.06
	1500	.04
	1600	.04
	1700	.10
	1800	.07
	1900	.03
	2000	.10
	2200	.02
	2300	.04
	2400	.09
1–11–74	0100	.08
	0200	.14
	0300	.05
	0400	.06
	0500	.12
	0600	.10
	0700	.04
	0800	.03
	1000	.01
	1100	.01
	1200	.01
1–12–74	0300	.01
	0400	.02
	0500	.01
	0600	.01
1–13–74	...	0
1–14–74	...	0
4– 2–77	*No	Record

*No Record 4–2–77 to 4–10–77.

Table A-5.—*Hourly precipitation for selected days at Davenport, Virginia (station number 42269)*

Date	*Time*	*Precipitation in inches*
2–25–66	*No record	
1–27–57	**No record	
5–4–58	2300	.01
	2400	.13
5–5–58	0100	.20
	0200	.22
	0300	.02
	0800	.28
	0900	.41
	1000	.05
	1100	.04
	1300	.11
	1500	.01
	1900	.01
	2100	.07
	2300	.08
	2400	.40
5–6–58	0100	.10
	0200	.16
	0300	.13
	0400	.08
	0600	.02
	1600	.26
	1700	.20
	1800	.23
	1900	.13
	2000	.05
	2100	.06
	2200	.01
	2300	.05
	2400	.04
5–7–58	0100	.01
	0200	.01
	0300	.02
	0400	.06
	0500	.03
	0600	.02
	0700	.01
	0900	.01
	1000	.01
5–7–58	1100	0.02
	1200	.01
	1400	.01
	1500	.04
	1600	.03
	1700	.02
	1800	.01
	1900	.04
5–8–58	...	0
5–9–58	...	0
3–10–63	...	0
3–11–63	0700	.04
	0800	.10
	0900	.06
	1000	.19
	1100	.11
	1200	.05
	1300	.04
	1400	.01
	1500	.05
	1600	.02
	1700	.01
	1800	.06
	1900	.01
	2000	.05
	2100	.30
	2200	.25
	2300	.65
	2400	.25
3–12–63	0100	.25
	0200	.17
	0300	.13
	0400	.15
	0500	.14
	0600	.05
	0700	.05
	0800	.01
3–13–63	...	0
3–14–63	...	0
3–15–63	...	0
3–5–67	...	0
3–6–67	0200	.03
	0300	.09
	0400	.03
	0500	.01
	0600	.31
	0700	.16
	0800	.10
	0900	.15
	1000	.08
	1100	.12
	1200	.07
	1300	.04
	1400	.01
	1900	.20
	2000	.40
	2100	.35
	2200	.26
	2300	.20
	2400	.16
3–7–67	0100	.10
	0200	.01
	0300	.01
	0400	.01
	0600	.02
	0700	.03
	0800	.02
3–8–67	...	0
3–9–67	...	0
2–24–72	0400	.01
	0500	.11
	0600	.33
	0700	.04
	0800	.01
	0900	.06
	1000	.06
2–24–72	1300	0.08
	1400	.10
	1500	.02
	1600	.13
	1700	.15
	1800	.02
	1900	.19
	2000	.06
	2100	.06
	2200	.03
2–25–72	1900	.01
	2000	.04
	2400	.01
2–26–72	0300	.01
	0400	.18
	0500	.05
	0600	.07
	0700	.03
	0800	.11
	0900	.04
	1100	.01
2–27-72	...	0
2–28–72	...	0
2–29–72	...	0
3–1–72	...	0
3–2–72	1800	.01
	1900	.05
	2000	.13
	2100	.05
	2200	.01
1–9–74	0100	.02
	0200	.05
	0300	.02
	0400	.11
	0500	.17
	0600	.05
	0700	.11

See footnotes at end of table.

Table A-5.—*Hourly precipitation for selected days at Davenport, Virginia (station number 42269)*—Continued

Date	*Time*	*Precipitation in inches*
1– 9–74	0800	0.02
	0900	.01
1–10–74	0600	.01
	0700	.04
	1200	.01
	1300	.09
	1400	.03
	1500	.19
	1600	.07
	1700	.12
	1800	.08
	1900	.08
	2000	.08
	2100	.17
	2200	.08
	2300	.04
	2400	.01
1–11–74	0100	0.05
	0200	.09
	0300	.11
	0400	.31
	0500	.29
	0600	.07
	0700	.03
	0800	.05
	0900	.11
	1000	.04
	1100	.05
	1200	.01
	1300	.03
1–12–74	...	0
1–13–74	...	0
1–14–74	...	0
4– 2–77	2200	0.18
	2300	.39
	2400	.15
4– 3–77	0100	.06
	0200	.01
	2100	.05
	2200	.09
	2300	.18
	2400	.19
4– 4–77	0100	.15
	0200	.22
	0300	.40
	0400	.21
	0500	.17
	0600	.16
	0700	.16
	0800	.30
	0900	.31
4– 4–77	1000	0.07
	1100	.24
	1200	.35
	1300	.51
	1400	.65
	1500	.14
4– 5–77	...	0
4– 6–77	...	0
4– 7–77	...	0
4– 8–77	...	0
4– 9–77	...	0
4–10–77	...	0

*No record 2–25–55 through 3–66–55.

**No record 1–27–57 through 1–31–57.

Table A-6.—*Hourly precipitation for selected days at Hurley, Virginia (station number 44180)*

Date	Time	Precipitation in inches
2–25–55	. . .	0
2–26–55	1300	.07
	1400	.07
	1500	.04
	1600	.20
	1700	.15
	1800	.07
	1900	.09
	2000	.09
	2100	.13
	2200	.11
	2300	.07
	2400	.01
2–27–55	0100	.07
	0200	.15
	0300	.13
	0400	.02
	0500	.15
	0600	.08
	0700	.42
	0800	.15
	0900	.08
	1000	.02
	1100	.02
	1200	.01
	1300	.01
	1400	.02
2–28–55	0100	.03
	0200	.02
	0300	.49
	0400	.06
	0500	.42
	0600	.06
	0700	.05
	0800	.09
	0900	.01
	1000	.19
	1100	.19
	1200	.20
	1300	.04
	1400	.02
	1500	.01
	1600	.05
	1700	.02
3– 1–55	0600	0.03
	0700	.07
	0800	.11
	0900	.29
	1000	.02
	1100	.01
	1200	.02
3– 2–55	. . .	0
3– 3–55	1100	.05
	1200	.05
	1300	.08
	1400	.03
	1500	.01
3– 4–55	2400	.14
3– 5–55	0100	.03
	0200	.24
	0300	.03
	0600	.30
	1400	.01
	1600	.03
	1700	.30
	1800	.06
	1900	.01
3– 6–55	0100	.02
	0300	.02
	0400	.10
	0500	.28
	0600	.20
	0700	.05
	0800	.32
	0900	.25
	1000	.15
	1100	.05
	1200	.10
	1300	.02
	1800	.01
	2000	.02
1–27–57	0300	.04
	0400	.03
	0500	.03
	0600	.07
	0700	.08
1–27–57	0800	0.01
	0900	.01
	1000	.02
	1100	.01
	1300	.04
	1400	.11
	1500	.02
	1600	.08
	1700	.01
	1900	.04
	2000	.05
	2100	.05
	2200	.01
	2300	.05
	2400	.02
1–28–57	0100	.02
	0200	.05
	0300	.04
	0400	.03
	0500	.06
	0600	.04
	0700	.02
	0800	.01
	0900	.01
	1000	.01
	1200	.06
	1300	.08
	1400	.15
	1500	.05
	1700	.01
	1800	.01
	1900	.01
	2000	.01
	2100	.01
	2400	.13
1–29–57	0100	.06
	0200	.14
	0300	.25
	0400	.26
	0500	.27
	0600	.24
	0700	.14
	0800	.16
	0900	.20
	1000	.16
1–29–57	1100	0.05
	1200	.03
	1300	.13
	1400	.14
	1500	.14
	1600	.03
	1700	.03
	1800	.01
1–30–57	2400	.01
1–31–57	0100	.03
	0200	.07
	0300	.01
	0400	.01
	0800	.08
	0900	.08
	1000	.01
	1600	.01
	1700	.10
	1800	.09
	1900	.08
	2000	.02
	2100	.01
	2200	.01
	2300	.01
	2400	.01
5– 4–58	1300	[a].06
	1400	[a].06
	1500	[a].06
	1600	[a].06
	1700	[a].06
	1800	[a].06
	1900	[a].06
	2000	[a].06
	2100	[a].06
	2200	[a].06
	2300	[a].06
	2400	[a].08
5– 5–58	0100	[a].03
	0200	[a].03
	0300	[a].03
	0400	[a].03
	0500	[a].03
	0600	[a].03
	0700	[a].03

See footnotes at end of table.

Table A-6.—*Hourly precipitation for selected days at Hurley, Virginia (station number 44180)*—Continued

Date	*Time*	*Precipitation in inches*
5–5–58	0800	[a]0.03
	0900	[a].03
	1000	[a].03
	1100	[a].03
	1200	[a].03
	1300	[a].03
	1400	[a].03
	1500	[a].03
	1600	[a].03
	1700	[a].03
	1800	[a].03
	1900	[a].03
	2000	[a].03
	2100	[a].03
	2200	[a].03
	2300	[a].03
	2400	[a].05
5–6–58	0100	[a].03
	0200	[a].03
	0300	[a].03
	0400	[a].03
	0500	[a].03
	0600	[a].03
	0700	[a].03
	0800	[a].03
	0900	[a].03
	1000	[a].03
	1100	[a].03
	1200	[a].03
	1300	[a].03
	1400	[a].03
	1500	[a].03
	1600	[a].03
	1700	[a].03
	1800	[a].03
	1900	[a].03
	2000	[a].03
	2100	[a].03
	2200	[a].03
	2300	[a].03
	2400	[a].05
5–7–58	0100	[a]0.07
	0200	[a].07
	0300	[a].07
	0400	[a].07
	0500	[a].07
	0600	[a].07
	0700	[a].07
	0800	[a].11
	1100	.05
	1200	.01
	1300	.01
	1500	.02
	1600	.06
	1800	.04
5–8–58	...	0
5–9–58	...	0
3–10–63	*No record	
3–5–67	...	0
3–6–67	0600	.03
	0700	.02
	0900	.01
	1000	.09
	1100	.14
	1200	.08
	1300	.26
	1400	.04
	1500	.11
	1600	.10
	1700	.08
	1800	.11
	1900	.10
	2000	.07
	2100	.01
	2400	.12
3–7–67	0100	.03
	0200	.32
3–7–67	0300	0.50
	0400	.45
	0500	.28
	0600	.21
	0700	.23
	0800	.23
3–8–67	...	0
3–9–67	...	0
2–24–72	0100	.01
	0200	.01
	0300	.06
	0400	.33
	0500	.36
	0600	.19
	0700	.18
	0800	.13
	0900	.12
	1000	.01
	1100	.02
	1300	.02
	1400	.10
	1500	.13
	1600	.12
	1700	.10
	1800	.13
	1900	.10
	2000	.05
	2100	.02
	2200	.02
	2400	.01
2–25–72	0200	.01
	0300	.01
	1300	.01
	1400	.03
	1500	.01
	1600	.01
	1700	.03
	1800	.01
	2400	.05
2–26–72	0100	.05
	0200	.51
2–26–72	0300	0.13
	0400	.03
	0600	.03
	0700	.05
	0800	.30
2–27–72	...	0
2–28–72	...	0
2–29–72	...	0
3–1–72	...	0
3–2–72	1900	.14
	2000	.15
	2100	.04
	2200	.04
	2400	.02
1–9–74	**No record	
4–2–77	2200	.10
	2300	.10
	2400	.10
4–3–77	0100	.20
	2200	.10
	2400	.20
4–4–77	0100	.20
	0200	.20
	0300	.20
	0400	.20
	0500	.10
	0600	.20
	0700	.20
	0900	.10
	1000	.20
	1100	.30
	1200	.20
	1300	.30
	1400	.40

See footnotes at end of table.

Table A-6.—*Hourly precipitation for selected days at Hurley, Virginia (station number 44180)*—Continued

Date	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*
4– 4–77	1500	0.02	4– 4–77	2100	0.20	4– 5–77	0400	0.10	4– 8–77	...	0
	1600	.10		2200	.20						
	1800	.10				4– 6–77	...	0	4– 9–77	...	0
	1900	.20		2300	.10						
	2000	.10		2400	.10	4– 7–77	1500	.10	4–10–77	...	0

[a]Estimated.

*No record 3–10–63 through 3–15–63.

**No record 1–9–74 through 1–14–74.

Table A-7.—*Hourly precipitation for selected days at Flat Top, West Virginia (station number 63072)*

Date	*Time*	*Precipitation in inches*
2–25–55	. . .	0
2–26–55	1300	.01
	1400	.04
	1500	.03
	1600	.01
	1700	.09
	1800	.04
	1900	.03
	2000	.04
	2100	.07
	2200	.06
	2300	.07
	2400	.10
2–27–55	0100	.01
	0200	.06
	0300	.19
	0400	.11
	0500	.01
	0600	.22
	0700	.42
	0800	.26
	0900	.13
	1000	.03
	1100	.01
	1300	.01
	2100	.01
	2200	.02
2–28–55	0100	.01
	0300	.04
	0400	.30
	0500	.10
	0600	.20
	0700	.01
	0800	.11
	0900	.24
	1000	.10
	1100	.29
	1200	.21
	1300	.12
	1400	.02
	1500	.01
3– 1–55	0700	.25
	0800	.33
3– 1–55	0900	0.07
	1000	.05
3– 2–55	. . .	0
3– 3–55	1200	.02
	1300	.02
	1400	.03
	1700	.01
	1800	.05
3– 5–55	0100	.01
	0200	.54
	0300	.16
	0400	.02
	0600	.20
	0700	.26
	0800	.01
	1600	.01
	1700	.12
	1800	.15
	2300	.41
3– 6–55	0200	.01
	0400	.02
	0500	.06
	0600	.17
	0700	.03
	0800	.05
	0900	.45
	1000	.15
	1100	.20
	1200	.05
	1300	.07
	1400	.02
	1500	.01
1–27–57	0300	.03
	0400	.02
	0600	.05
	0700	.06
	0800	.03
	0900	.01
	1200	.05
	1400	.02
	1500	.02
	1600	.01
1–27–57	1700	0.01
	1900	.01
	2000	.03
	2100	.04
	2200	.01
	2400	.07
1–28–57	0100	.07
	0200	.07
	0300	.08
	0400	.01
	0500	.10
	0600	.09
	0700	.06
	0800	.05
	0900	.05
	1100	.04
	1200	.01
	1300	.15
	1400	.16
	1500	.18
	1600	.01
	2200	.04
	2300	.04
1–29–57	0100	.02
	0200	.03
	0300	.12
	0400	.24
	0500	.41
	0600	.15
	0700	.12
	0800	.15
	0900	.18
	1000	.21
	1100	.15
	1200	.10
	1300	.05
	1400	.13
	1500	.17
	1600	.11
	1700	.03
	1800	.04
	1900	.01
	2300	.01
	2400	.04
1–30–57	1900	0.01
	2000	.01
	2200	.01
	2300	.01
	2400	.01
1–31–57	0100	.03
	0200	.06
	0300	.02
	0500	.02
	0700	.02
	0800	.10
	0900	.16
	1000	.08
	1100	.06
	1200	.03
	1300	.01
	1400	.01
	1500	.01
	1600	.03
	1700	.10
	1800	.16
	1900	.10
	2000	.05
5– 4–58	1400	.02
5– 5–58	0100	.02
	0200	.13
	0300	.24
	0400	.01
	0900	.20
	1000	.44
	1100	.15
	1200	.04
	1300	.01
	2400	.11
5– 6–58	0100	.04
	0200	.15
	0300	.02
	0400	.11
	0500	.05
	0700	.01
	1900	.07
	2000	.10
	2100	.06

Table A-7.—*Hourly precipitation for selected days at Flat Top, West Virginia (station number 63072)*—Continued

Date	*Time*	*Precipitation in inches*
5– 6–58	2200	0.01
	2300	.02
5– 7–58	0200	.01
	0300	.01
	0400	.02
	0500	.01
	0600	.01
	0700	.05
	1000	.01
	1100	.01
	1200	.02
	1300	.01
	1700	.04
	1800	.01
	1900	.01
	2000	.02
5– 8–58	...	0
5– 9–58	...	0
3–10–63	0400	.02
	0600	.03
3–11–63	0900	.13
	1000	.06
	1100	.15
	1200	.11
	1300	.01
	1400	.04
	1500	.01
	1600	.11
	1700	.36
	1800	.24
	1900	.12
	2000	.02
	2100	.27
	2200	.29
	2300	.30
	2400	.20
3–12–63	0100	.10
	0200	.12
	0300	.20
	0400	.10
	0500	.06
3–12–63	0600	0.05
	0700	.04
	0800	.01
3–13–63	...	0
3–14–63	...	0
3–15–63	...	0
3– 5–67	0600	.02
	1100	.01
	1200	.01
	1500	.08
	1600	.15
	1700	.04
3– 6–67	0200	.01
	0300	.02
	0400	.08
	0500	.05
	0600	.12
	0700	.05
	0800	.02
	0900	.03
	1000	.05
	1100	.02
	1200	.08
	1300	.03
	1500	.02
	1600	.11
	1700	.09
	1800	.02
	1900	.01
	2000	.17
	2100	.14
	2200	.16
	2300	.04
	2400	.11
3– 7–67	0100	.14
	0200	.02
	0300	.04
	0700	.01
	0800	.01
	0900	.03
	1100	.02
	1200	.01
3– 8–67	...	0
3– 9–67	...	0
2–24–72	0300	.02
	0400	.16
	0500	.22
	0600	.12
	0700	.12
	0800	.15
	0900	.10
	1300	.02
	1400	.08
	1500	.12
	1600	.06
	1700	.05
	1800	.13
	1900	.11
	2000	.03
	2100	.01
	2300	.01
	2400	.01
2–25–72	0200	.02
	1400	.01
	1600	.01
	2000	.03
	2100	.07
	2300	.01
	2400	.17
2–26–72	0100	.23
	0200	.16
	0300	.30
	0400	.11
	0500	.06
	0600	.07
	0700	.02
	0800	.02
	0900	.15
	1000	.02
	1100	.02
	1200	.01
2–27–72	...	0
2–28–72	...	0
2–29–72	...	0
3– 1–72	...	0
3– 2–72	1900	.01
	2000	.18
	2100	.09
	2200	.16
	2300	.02
1– 9–74	0200	.08
	0300	.04
	0400	.16
	0500	.13
	0600	.20
	0700	.10
	0800	.07
	0900	.02
1–10–74	0500	.04
	0600	.02
	0700	.13
	0800	.10
	0900	.01
	1000	.09
	1100	.11
	1200	.14
	1300	.06
	1500	.04
	1600	.04
	1700	.06
	1800	.02
	1900	.06
	2000	.02
	2100	.05
	2200	.01
	2300	.09
	2400	.01
1–11–74	0100	.04
	0200	.10
	0300	.16
	0400	.14
	0500	.19
	0600	.06
	0700	.08
	0800	.12
	0900	.06

Table A-7.—*Hourly precipitation for selected days at Flat Top, West Virginia (station number 63072)*—Continued

Date	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*
1–11–74	0900	0.06	1–11–74	1300	0.01	1–12–74	. . .	0	1–14–74	2400	0.01
	1000	.04		1400	.03						
	1200	.05		1600	.01	1–13–74	. . .	0	4– 2–77	*No record	

*No record 4–2–77 through 4–10–77.

Table A-8.—*Hourly precipitation for selected days at Gray, West Virginia (station number 63353)*

Date	*Time*	*Precipitation in inches*
2–25–55	. . .	0
2–26–55	1300	.04
	1400	.06
	1500	.06
	1600	.08
	1700	.07
	1800	.03
	1900	.11
	2000	.05
	2100	.05
	2200	.12
	2300	.05
	2400	.03
2–27–55	0100	.03
	0200	.11
	0300	.16
	0400	.07
	0500	.07
	0600	.13
	0700	.33
	0800	.23
	0900	.10
	1000	.04
	1300	.03
2–28–55	0200	.02
	0300	.01
	0400	.27
	0500	.07
	0600	.10
	0700	.04
	0900	.04
	1100	.18
	1200	.24
	1300	.11
	1500	.01
3– 1–55	0400	.01
	0600	.01
	0700	.25
	0800	.35
	0900	.04
	1000	.06
3– 2–55	. . .	0
3– 3–55	1100	0.02
	1200	.05
	1300	.05
	1400	.04
	1700	.02
3– 4–55	. . .	0
3– 5–55	0100	.32
	0200	.11
	0300	.05
	0400	.01
	0500	.16
	0600	.09
	0700	.01
	1700	.37
	1800	.12
	1900	.03
3– 6–55	0400	.02
	0500	.13
	0600	.12
	0700	.21
	0800	.37
	0900	.20
	1000	.20
	1100	.07
	1200	.07
	1300	.02
	1400	.03
1–27–57	0400	.04
	0500	.04
	0600	.06
	0700	.10
	0800	.01
	0900	.03
	1000	.01
	1100	.01
	1300	.02
	1400	.12
	1500	.02
	1600	.07
	1700	.05
	1900	.02
	2000	.03
	2100	.01
1–27–57	2200	0.04
	2300	.02
	2400	.03
1–28–57	0100	.06
	0200	.06
	0300	.08
	0400	.04
	0500	.03
	0600	.03
	0700	.01
	0800	.03
	0900	.01
	1000	.02
	1100	.01
	1200	.04
	1300	.03
	1400	.05
	1500	.04
	2000	.01
	2100	.01
	2200	.03
	2400	.01
1–29–57	0100	.09
	0200	.04
	0300	.20
	0400	.20
	0500	.18
	0600	.08
	0700	.14
	0800	.40
	0900	.12
	1000	.36
	1100	.03
	1200	.10
	1300	.05
	1400	.10
	1500	.12
	1600	.03
	1900	.01
	2000	.01
1–30–57	2400	.01
1–31–57	0100	.01
	0200	.07
1–31–57	0300	0.03
	0400	.01
	0500	.02
	0600	.02
	0700	.05
	0800	.06
	0900	.18
	1000	.01
	1100	.01
	1400	.01
	1700	.10
	1800	.09
	1900	.10
	2000	.02
	2300	.01
	2400	.01
3–10–63	. . .	0
3–11–63	0900	.15
	1000	.05
	1100	.10
	1200	.05
	1300	.01
	1400	.01
	1500	.03
	1600	.10
	1700	.07
	1800	.09
	1900	.04
	2000	.02
	2100	.38
	2200	.19
	2300	.36
	2400	.23
3–12–63	0100	.24
	0200	.15
	0300	.20
	0400	.08
	0500	.10
	0600	.03
	0700	.07
	0800	.02
3–13–63	. . .	0

Table A-8.—*Hourly precipitation for selected days at Gray, West Virginia (station number 63353)*—Continued

Date	*Time*	*Precipitation in inches*
3–14–63	. . .	0
3–15–63	. . .	0
3– 5–67	2000	.01
3– 6–67	0200	.04
	0300	.05
	0400	.03
	0600	.36
	0700	.07
	0800	.10
	0900	.09
	1000	.03
	1100	.08
	1200	.05
	1400	.01
	1600	.09
	1900	.06
	2000	.38
	2100	.26
	2200	.20
	2300	.06
	2400	.11
3– 7–67	0100	.10
	0200	.03
	0500	.01
	0600	.02
	0700	.01
	0800	.01
3– 8–67	. . .	0
3– 9–67	. . .	0
2–24–72	0400	.15
	0500	.36
	0600	.13
	0700	.14
	0800	.11
2–24–72	0900	0.01
	1000	.01
	1300	.02
	1400	.05
	1500	.08
	1600	.08
	1700	.08
	1800	.10
	1900	.14
	2000	.15
	2100	.05
2–25–72	0300	.01
	0400	.01
	0500	.02
	0600	.01
	1000	.03
	1100	.01
	1300	.03
	1900	.03
	2000	.07
	2400	.14
2–26–72	0100	.13
	0200	.01
	0300	.22
	0400	.18
	0500	[a].07
	0600	[a].07
	0700	[a].09
	0800	.06
	0900	.09
	1000	.04
	1100	.01
2–27–72	. . .	0
2–28–72	. . .	0
2–29–72	. . .	0
3– 1–72	. . .	0
3– 2–72	1900	0.10
	2000	.20
	2100	.17
	2200	.04
	2300	.01
1– 9–74	0300	.10
	0400	.10
	0500	.10
	0600	.10
	0700	.10
	1300	.10
1–10–74	0600	.10
	0800	.10
	1300	.10
	1500	.10
	1700	.10
	1800	.10
	2000	.10
	2100	.10
1–11–74	0100	.10
	0200	.10
	0300	.20
	0400	.20
	0500	.20
	0700	.10
	0900	.10
	1000	.10
1–12–74	. . .	0
1–13–74	. . .	0
1–14–74	. . .	0
4– 2–77	2200	.10
	2300	.20
	2400	.10
4– 3–77	0100	0.20
	2200	.10
	2400	.20
4– 4–77	0100	.20
	0200	.20
	0300	.20
	0400	.20
	0500	.20
	0600	.10
	0700	.20
	0800	.20
	0900	.10
	1000	.10
	1100	.10
	1200	.40
	1300	.20
	1400	.30
	1500	.50
	1700	.10
	1800	.10
	1900	.10
	2000	.10
	2100	.30
	2200	.20
	2300	.20
	2400	.10
4– 5–77	0200	.10
	0700	.10
	0800	[a].01
	0900	[a].01
	1000	[a].01
	1100	[a].01
	1200	[a].01
	1300	[a].01
	1400	[a].01
	1500	[a].01
4– 6–77	*No	Record

[a] Estimated.

*No record 4–6–77 through 4–10–77.

Table A-9.—*Hourly precipitation for selected days at Logan, West Virginia (station number 65353)*

Date	Time	Precipitation in inches
2–25–55	. . .	0
2–26–55	1200	.05
	1300	.05
	1400	.03
	1500	.01
	1900	.06
	2000	.04
	2100	.11
	2200	.14
	2300	.14
	2400	.01
2–27–55	0100	.01
	0200	.09
	0300	.09
	0400	.01
	0500	.07
	0600	.33
	0700	.30
	0800	.05
	0900	.02
	2300	.03
	2400	.01
2–28–55	0200	.15
	0300	.33
	0400	.02
	0500	.12
	0600	.02
	0700	.01
	0900	.15
	1000	.05
	1100	.19
	1200	.11
3– 1–55	0400	.02
	0500	.01
	0600	.07
	0700	.33
	0800	.17
	0900	.12
	1000	.02
3– 2–55	. . .	0
3– 3–55	1000	0.02
	1200	.03
	1300	.01
	1400	.01
	1500	.01
	1600	.01
	1700	.01
3– 4–55	0900	.11
	1000	.24
	1100	.01
	1200	.05
	1300	.02
	1400	.03
	1500	.09
	2300	.02
	2400	.25
3– 5–55	0100	.20
	0200	.40
	0400	.25
	0500	.30
	0600	.35
	0700	.02
	1600	.07
	1700	.03
	1800	.19
	2100	.02
	2300	.01
3– 6–55	0100	.03
	0200	.01
	0600	.10
	0700	.09
	0800	.21
	0900	.13
	1000	.09
	1100	.07
	1200	.04
	1300	.02
	2000	.03
1–27–57	0400	.03
	0500	.02
1–27–57	0600	0.04
	0700	.02
	0900	.04
	1000	.04
	1100	.01
	1400	.01
	2400	.08
1–28–57	0100	.05
	0200	.02
	0300	.10
	0400	.05
	0500	.06
	0600	.07
	0700	.03
	0800	.08
	0900	.05
	1000	.01
	1100	.05
	1200	.03
	1300	.06
	1400	.04
	1500	.02
	1600	.01
	1900	.01
	2000	.01
	2100	.07
	2200	.03
	2400	.07
1–29–57	0100	.07
	0200	.06
	0300	.07
	0400	.07
	0500	.01
	0600	.17
	0700	.10
	0800	.24
	0900	.20
	1000	.10
	1100	.11
	1200	.05
	1300	.08
	1400	.11
	1500	.06
1–29–57	1600	0.02
	1700	.02
1–30–57	2200	[a].10
	2300	[a].10
	2400	[a].12
1–31–57	*No	record.
5– 4–58	1300	.15
	1400	.09
	1500	.02
5– 5–58	0200	.07
	0300	.04
	0400	.20
	0800	.01
	0900	.05
	1000	.15
	1100	.09
	1200	.02
	1300	.01
5– 6–58	0100	.02
	0200	.10
	0300	.04
	0400	.02
	0500	.51
	0600	.09
	0700	.01
	1500	.14
	1600	.35
	1700	.26
	1800	.05
	1900	.03
	2000	.07
	2100	.08
	2200	.10
	2300	.03
	2400	.02
5– 7–58	0100	.08
	0200	.06
	0300	.09
	0400	.07

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[a] Estimated.

Table A-9.—*Hourly precipitation for selected days at Logan, West Virginia (station number 65353)*—Continued

Date	*Time*	*Precipitation in inches*
5–7–58	0800	0.03
	1200	.01
	1300	.01
	1400	.04
	1500	.04
	1600	.02
	1700	.02
	1800	.02
5–8–58	...	0
5–9–58	...	0
3–10–63	0300	.02
	0400	.01
3–11–63	0800	.08
	0900	.11
	1000	.05
	1100	.01
	1200	.17
	1300	.22
	1400	.12
	1500	.24
	1600	.10
	1700	.19
	1800	.16
	1900	.10
	2000	.19
	2100	.34
	2200	.64
	2300	.27
	2400	.03
3–12–63	0100	.02
	0200	.01
	0300	.05
3–13–63	...	0
3–14–63	...	0
3–15–63	...	0
3–5–67	1400	0.02
	1600	.03
	1700	.01
	1800	.01
	2000	.01
3–6–67	0100	.04
	0200	.04
	0400	.05
	0500	.35
	0600	.14
	0700	.05
	0800	.01
	0900	.10
	1000	.06
	1100	.07
	1200	.02
	1500	.01
	1600	.05
	1700	.13
	1800	.09
	1900	.33
	2000	.37
	2100	.17
	2200	.12
	2300	.08
	2400	.15
3–7–67	0100	[a].01
	0200	[a].01
	0300	[a].01
	0400	[a].01
	0500	[a].01
	0600	[a].01
	0700	[a].01
	0800	[a].01
	0900	[a].01
	1000	[a].01
	1100	[a].01
	1200	[a].01
	1300	[a].01
	1400	[a].01
	1500	[a].01
3–8–67	...	0
3–9–67	...	0
2–24–72	0200	.10
	0300	.35
	0400	.21
	0500	.19
	0600	.15
	0700	.17
	0800	.07
	1500	.04
	1600	.07
	1700	.14
	1800	.13
	1900	.13
	2000	.09
	2100	.01
2–25–72	1300	.01
	1400	.01
	2100	.13
	2200	.30
	2300	.15
	2400	.01
2–26–72	0100	.31
	0200	.17
	0300	.01
	0400	.14
	0500	.08
	0600	.05
	0700	.08
	0800	.03
	0900	.01
	1000	.01
	1100	.02
2–27–72	...	0
2–28–72	...	0
2–29–72	...	0
3–1–72	0100	[a]0.01
	0200	[a].01
	0300	[a].01
	0400	[a].01
	0500	[a].01
	0600	[a].01
	0700	[a].01
	0800	[a].01
	0900	[a].01
	1000	[a].01
	1100	[a].01
	1200	[a].01
	1300	[a].01
	1400	[a].01
	1500	[a].01
	1600	[a].01
	1700	[a].01
3–2–72	0100	[a].01
	0200	[a].01
	0300	[a].01
	0400	[a].01
	0500	[a].01
	0600	[a].01
	0700	[a].01
	0800	[a].01
	0900	[a].01
	1000	[a].01
	1100	[a].01
	1200	[a].01
	1300	[a].01
	1400	[a].01
	1500	[a].01
	1600	[a].01
	1700	[a].01
1–9–74	0100	.03
	0200	.06
	0300	.04
	0400	.20
	0500	.01
1–10–74	0400	.05
	0500	.20
	0600	.16

[a] Estimated.

Table A-9.—*Hourly precipitation for selected days at Logan, West Virginia (station number 65353)*—Continued

Date	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*	*Date*	*Time*	*Precipitation in inches*
1–10–74	0700	0.36	1–10–74	1800	0.05	1–11–74	0300	0.10	1–11–74	1300	0.01
	0800	.25		1900	.07		0400	.09		1800	.01
	0900	.35		2000	.08		0500	.04			
	1000	.14		2100	.05		0600	.10	1–12–74	1600	.08
	1100	.08		2200	.07		0700	.21			
	1200	.03		2300	.03		0800	.05	1–13–74	...	0
	1400	.05		2400	.01		0900	.05			
	1500	.03					1100	.04	1–14–74	...	0
	1600	.06	1–11–74	0100	.03		1200	.03			
	1700	.06		0200	.12				4– 2–77	*No record.	

[a]Estimated.

*No record 4–2–77 through 4–10–77.

Table A-10.—*Annual maximum daily precipitation at Burdine, Kentucky (station 51120)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1952	1–22–52	[a]1.35	1965	7–11–65	2.00
1953	5– 3–53	2.80	1966	5– 2–66	4.00
1954	7– 8–54	2.70	1967	3– 7–67	2.00
1955	7–29–55	1.75	1968	8–11–68	1.93
1956	8–20–56	3.20	1969	7–21–69	2.30
1957	1–29–57	2.47	1970	4–28–70	2.20
1958	5– 7–58	2.10	1971	5– 7–71	3.25
1959	9–11–59	2.10	1972	6–17–72	1.95
1960	11–24–59	2.20	1973	6–28–73	1.85
1961	7–30–62	1.82	1974	6–22–74	5.30
1962	10– 4–61	1.55	1975	5–18–75	4.10
1963	3–12–63	3.50	1976	6–20–76	2.08
1964	6– 1–64	1.90	1977	4– 5–77	2.50

[a] May not be annual maximum.

Table A-11.—*Annaul maximium daily precipitation at Davella, Kentucky (station 52053)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1941	7– 2–41	2.68	1960	7–10–60	1.73
1942	8– 5–42	2.22	1961	7–30–61	2.89
1943	4–19–43	1.72	1962	2–27–62	2.63
1944	4–11–44	1.80	1963	6–20–63	2.79
1945	12–31–44	1.63	1964	7–12–64	2.03
1946	1– 7–46	2.55	1965	8– 1–65	1.45
1947	....	(a)	1966	7–13–66	3.31
1948	7–14–48	4.18	1967	3– 6–67	3.19
1949	6–28–45	2.88	1968	7–22–68	2.15
1950	7–26–50	2.45	1969	8–19–69	4.23
1951	2– 1–51	2.74	1970	12–30–69	2.13
1952	3–22–52	3.11	1971	10–29–70	2.69
1953	12–10–52	1.50	1972	4– 7–72	1.50
1954	9–20–54	1.23	1973	5–23–73	2.75
1955	6–25–55	1.96	1974	11–27–73	3.29
1956	6–22–56	2.15	1975	9–12–75	[b]2.19
1957	4– 8–57	1.60	1976	11–12–75	[b]2.10
1958	11–18–58	1.56	1977	4– 4–77	[b]2.37
1959	5–13–59	1.95	1978	....	(a)

[a] Not determined.
[b] May not be annual maximum.

Table A-12.—*Annual maximum daily precipitation at Louisa, Kentucky (station 54946)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1942	8–24–42	3.76	1961	6–14–61	2.22
1943	12–30–42	2.43	1962	2–27–62	2.93
1944	4–12–44	1.95	1963	3–12–63	1.75
1945	1– 1–45	2.43	1964	9–29–64	1.94
1946	6– 2–46	1.75	1965	6– 3–65	1.81
1947	9– 6–47	[a]2.14	1966	7–13–66	2.62
1948	4–13–47	3.30	1967	3– 7–67	1.98
1949	11–28–48	1.74	1968	3–12–68	2.21
1950	9–21–50	2.46	1969	8–20–69	2.40
1951	8–27–51	3.91	1970	9– 5–70	2.10
1952	3–22–52	[a]1.70	1971	10–30–70	2.59
1953	6–22–53	4.34	1972	7–29–72	3.00
1954	9–20–54	2.80	1973	12– 9–72	1.97
1955	3– 1–55	1.55	1974	5–30–74	2.65
1956	3–14–56	1.61	1975	3–29–75	2.00
1957	9–13–57	2.70	1976	3–21–76	1.70
1958	11–18–57	1.97	1977	7–22–77	1.82
1959	5–13–59	1.30	1978	10– 2–77	2.70
1960	7– 4–60	1.63			

[a] May not be annual maximum.

Table A-13.—*Annual maximum daily precipitation at Pikeville, Kentucky (station 56353)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1935	3–12–35	2.76	1957	1–29–57	2.04
1936	7– 6–36	2.32	1958	8–12–58	2.43
1937	7–13–37	1.56	1959	5–13–59	2.77
1938	6–20–38	2.17	1960	9–11–60	2.17
1939	2– 3–39	2.26	1961	6–15–61	2.73
1940	7– 4–40	1.63	1962	10– 3–61	2.05
1941	6– 9–41	1.99	1963	3–11–63	2.15
1942	7– 1–42	3.41	1964	11–29–63	2.20
1943	4–19–43	2.94	1965	2–29–65	1.62
1944	4–12–44	2.35	1966	7–13–66	2.83
1945	3– 6–45	1.78	1967	3– 6–67	1.75
1946	1– 8–46	1.87	1968	6–12–68	2.30
1947	9– 6–47	1.80	1969	7–22–69	1.27
1948	6–15–48	3.02	1970	9–20–70	2.83
1949	12– 3–49	1.42	1971	6–14–71	3.12
1950	9–20–50	1.90	1972	2–26–72	1.70
1951	9– 1–51	1.77	1973	5–23–73	1.95
1952	3–22–52	1.78	1974	7–26–74	2.50
1953	9– 5–53	1.96	1975	9–12–75	1.53
1954	9–20–54	1.72	1976	7–30–76	2.03
1959	3–16–55	1.86	1977	4– 4–77	3.07
1956	9–15–56	2.69	1978	4–26–78	2.98

Table A-14.—*Annual maximum dialy precipitation at Davenport, Virginia (station 42269)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1941	9– 5–41	1.83	1960	10–23–59	1.51
1942	8–22–42	2.00	1961	7–31–61	2.05
1943	7– 5–43	1.76	1962	10– 3–61	1.87
1944	8–14–44	2.00	1963	3–11–63	2.25
1945	7–10–45	2.00	1964	11–29–64	2.43
1946	5–27–46	[a]1.85	1965	6–30–65	2.73
1947	8– 3–47	2.00	1966	7–13–66	2.59
1947	8–22–47	2.00	1967	3– 6–67	2.77
1948	9–10–48	1.37	1968	9– 9–68	2.13
1949	8–29–49	1.73	1969	1–20–69	.94
1950	6–27–50	2.15	1970	12–30–69	2.74
1951	7–25–51	1.05	1971	7–19–71	1.48
1952	3–28–52	2.00	1972	1–20–72	2.09
1953	6– 6–53	2.10	1973	3–16–73	2.39
1954	7– 8–54	2.07	1974	11–27–73	1.80
1955	7– 6–55	1.80	1975	5– 1–75	[a]1.62
1956	6–22–56	2.57	1976	12–31–75	1.20
1957	1–29–57	2.61	1977	4– 4–77	4.04
1958	8–24–58	2.67	1978	10– 1–77	2.81
1959	5–27–59	2.33			

[a] May not be annual maximum.

Table A-15.—*Annual maximum daily precipitation at Hurley, Virginia (station 44180)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1942	7–22–42	2.80	1960	7– 1–60	2.08
1942	1–26–43		1961	7–22–61	1.72
1943	3– 3–43	1.54	1962	....	(a)
1944	5–17–44	1.68	1963	....	(a)
1945	8– 2–45	2.73	1964	....	(a)
1946	11– 2–45	2.09	1965	8–17–65	1.95
1947	8– 3–47	3.69	1966	7–13–66	3.37
1948	8– 3–48	2.32	1967	3– 7–67	2.25
1949	12– 3–48	1.85	1968	5–27–68	2.11
1950	7–26–50	1.89	1969	7–11–69	1.47
1951	8–27–51	1.79	1970	12–30–69	2.66
1952	8–12–52	2.90	1971	9– 6–71	2.26
1953	12–10–52	2.08	1972	2–24–72	2.22
1954	7–21–54	1.84	1973	3–15–73	1.19
1955	2–28–55	1.95	1974	6–27–74	2.60
1956	4–15–56	2.06	1975	3–24–75	1.60
1957	7–23–57	2.73	1976	6–20–76	2.10
1958	6– 9–58	1.55	1977	4– 4–77	4.10
1959	1–21–59	1.58	1978	11– 6–77	2.20

[a] Not determined.

Table A-16.—*Annual maximum daily precipitation at Flat Top, West Virginia (station 63072)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1941	11– 2–40	1.28	1960	10–23–59	1.18
1942	8– 5–42	1.98	1961	2–25–61	2.07
1943	6– 6–43	2.05	1962	9– 4–62	[a]1.70
1944	2–17–44	1.29	1963	3–11–63	2.22
1945	9–17–45	2.05	1964	9–29–64	2.28
1946	7–21–46	2.77	1965	3–26–65	1.93
1947	9– 6–47	1.90	1966	9–14–66	[a]3.04
1948	6–18–48	1.48	1967	11– 3–66	[a]1.73
1949	8–15–49	3.09	1968	1–14–68	[a]1.50
1950	7–26–50	2.26	1969	8–20–69	3.24
1951	8–27–51	1.23	1970	12–30–70	1.72
1952	7–17–52	1.93	1971	4– 7–71	1.65
1953	6– 6–53	1.48	1972	7– 5–72	2.00
1954	7–20–54	1.89	1973	10– 5–72	1.34
1955	10–15–54	3.39	1974	5–30–74	2.00
1956	4–15–56	1.74	1975	10–16–74	2.69
1957	1–29–57	2.40	1976	1– 1–76	2.37
1958	8–24–58	1.51	1977	4– 5–77	2.90
1959	8– 4–59	1.97	1978	10– 9–77	2.00

[a]May not be annual maximum.

Table A-17.—*Annual maximum daily precipitation at Gary, West Virginia (station 63353)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1942	6– 1–42	1.81	1960	6–22–60	1.72
1943	12– 2–42	1.57	1961	5–12–61	1.12
1944	2–18–44	1.54	1962	7–23–62	1.58
1945	10–21–44	1.92	1963	3–12–63	2.66
1946	1– 8–46	1.70	1964	9–30–64	2.40
1947	8– 4–47	2.84	1965	8–22–65	2.07
1948	9–10–48	1.60	1966	9–14–66	2.23
1949	6–17–49	1.97	1967	3– 7–67	1.50
1950	7–21–50	1.58	1968	5–27–68	1.56
1951	8–28–51	1.61	1969	7–23–69	2.34
1952	8–20–52	1.55	1970	12–30–69	1.54
1953	5–19–53	2.10	1971	5– 7–71	2.66
1954	7–21–54	4.29	1972	8–18–72	2.48
1954	2–27–55	2.05	1973	7–26–73	2.14
1955	3–16–55	2.05	1974	1–11–74	1.47
1956	10– 8–55	1.53	1975	9– 1–75	3.80
1957	9–17–57	1.63	1976	9–15–76	1.31
1957	5– 6–58	1.60	1977	4– 5–77	2.98
1958	8–25–58	1.60	1978	8– 4–78	2.59
1959	8–29–59	1.36			

Table A-18.—*Annual maximum daily precipitation at Logan, West Virginia (station 65353)*

Water year	*Date*	*Precipitation (inches)*	*Water year*	*Date*	*Precipitation (inches)*
1942	3– 3–42	1.60	1961	6–14–61	1.49
1943	12–30–42	1.68	1962	2–27–62	2.49
1944	8–15–44	2.27	1963	6–29–63	3.04
1945	7–27–45	1.67	1964	9–30–64	2.20
1946	11– 3–45	1.59	1965	6– 3–65	2.33
1947	9– 6–47	2.69	1966	9–14–66	2.17
1948	10– 9–47	2.04	1967	5–15–67	2.15
1949	6–10–49	1.88	1968	6–12–68	2.00
1950	9–20–50	2.75	1969	8–20–69	4.00
1951	2– 1–51	2.07	1970	2–15–70	1.94
1952	7–17–52	2.27	1971	7–20–71	2.22
1953	5–18–53	1.22	1972	4–14–72	2.32
1954	9–20–54	3.26	1973	12– 9–72	1.57
1955	3– 5–55	2.19	1974	5–30–74	3.91
1956	3–14–56	1.66	1975	8– 4–75	1.97
1957	7–10–57	1.86	1976	8–14–76	4.02
1958	7–27–58	2.04	1977	10– 9–76	[a]1.52
1959	10– 1–58	1.23	1978	8–31–78	[a]1.70
1960	9–11–60	1.50			

[a] May not be annual maximum.

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Table B-1.—*Annual maximum discharge and gage height for station 03213000 Tug Fork at Litwar, West Virginia*

Water year	*Date*	*Gage height (ft)*	*Peak discharge* (ft^3/s)
1931	4– 1–31	9.18	5,630
1932	1–30–32	11.78	9,770
1933	2–15–33	10.55	7,790
1934	3– 3–34	14.78	16,000
1935	3–25–35	19.00	27,600
1936	4– 6–36	13.73	13,100
1937	2– 9–37	12.56	11,200
1938	3– 3–38	14.00	13,600
1939	2– 3–39	12.90	11,700
1940	8–31–40	7.80	3,850
1941	3–11–41	10.30	7,310
1942	6–20–42	[a]9.10	5,490
1943	3–13–43	10.58	14,000
1944	2–18–44	11.46	15,800
1945	2–17–45	13.20	19,400
1946	1– 7–46	13.36	19,800
1947	1–16–47	7.68	7,930
1948	2–13–48	10.06	12,900
1949	12– 4–48	8.21	8,930
1950	2– 2–50	13.70	20,500
1951	12– 8–50	6.77	6,720
1952	4–28–52	10.00	12,700
1953	5–19–53	11.75	16,500
1954	7–21–54	10.70	14,200
1955	3– 6–55	14.90	23,000
1956	4–16–56	10.50	13,500
1957	1–29–57	21.60	35,700
1958	8–25–58	11.78	16,100
1959	4–12–59	8.08	8,700
1960	11–28–59	5.90	4,660
1961	2–25–61	8.24	8,900
1962	2–28–62	8.02	10,200
1963	3–12–63	17.89	28,300
1964	3– 9–64	6.86	7,580
1965	3–26–65	11.66	16,300
1966	5– 2–66	7.82	8,960
1967	3– 7–67	13.99	20,700
1968	5–27–68	10.35	13,800
1969	1–21–69	3.54	2,230
1970	2–16–70	9.15	11,500

Table B-1.—*Annual maximum discharge and gage height for station 03213000 Tug Fork at Litwar, West Virginia*—Continued

Water year	*Date*	*Gage height (ft)*	*Peak discharge (ft^3/s)*
1971	5– 7–71	10.19	13,500
1972	1–21–72	12.23	17,300
1973	3–17–73	12.93	18,700
1974	1–11–74	12.87	18,600
1975	3–14–75	12.70	18,200
1976	1– 1–76	5.80	5,430
1977	4– 4–77	27.37	54,500
1978	1–26–78	16.64	25,800

[a] Prior to October 16, 1942, non-recording gage 0.5 mile upstream at same datum.

Table B-2.—*Annual maximum discharge and gage height for station 03213500 Panther Creek near Panther, West Virginia*

Water year	*Date*	*Gage height (ft)*	*Peak discharge (ft^3/s)*
1947	1–20–47	4.97	576
1948	2–13–48	7.47	1,700
1949	3–18–49	5.88	948
1950	2– 2–50	6.85	1,350
1951	2– 1–51	5.82	906
1952	4–28–52	6.58	1,260
1953	5–19–53	6.63	1,260
1954	1–22–54	4.71	492
1955	3– 6–55	8.98	4,200
1956	4–15–56	7.14	1,670
1957	1–29–57	9.50	3,600
1958	5– 7–58	6.60	1,350
1959	1–22–59	6.98	1,660
1960	11–28–59	5.67	798
1961	5–12–61	7.16	1,810
1962	2–28–62	5.96	1,120
1963	3–12–63	10.67	4,570
1964	3– 8–64	6.59	836
1965	1–10–65	7.93	1,890
1966	9–27–66	7.96	1,920
1967	3– 7–67	10.71	4,600
1968	5–27–68	6.63	1,060
1969	1–20–69	4.59	308
1970	2–15–70	7.84	1,820
1971	5– 6–71	7.38	1,480
1972	2–24–72	7.43	1,510
1973	3–16–73	8.70	2,510
1974	1–11–74	7.80	1,790
1975	4–25–75	8.22	2,130
1976	12–31–75	5.24	452
1977	4– 4–77	11.16	5,140
1978	1–26–78	9.46	3,210

Table B-3.—*Annual maximum discharge and gage height for station 03213700 Tug Fork at Williamson, West Virginia*

Water year	*Date*	*Gage height (ft)*	*Peak discharge (ft^3/s)*
1968	5–28–68	[a]27.73	20,000
1969	1–21–69	11.43	5,440
1970	12–31–69	31.54	22,600
1971	5– 7–71	29.97	23,300
1972	2–25–72	29.75	20,600
1973	3–17–73	32.65	23,800
1974	1–12–74	37.37	29,200
1975	3–30–75	32.01	23,100
1976	1– 1–76	17.02	8,720
1977	4– 5–77	52.56	94,000
1978	1–26–78	37.80	36,500

[a] Gage datum 0.92 feet lower.

Table B-4.—*Annual maximum discharge and gage height for station 03214000 Tug Fork at Kermit, West Virginia*

Water year	*Date*	*Gage height (ft)*	*Peak discharge (ft^3/s)*
1935	3–26–35	35.75	34,200
1936	4– 7–36	28.28	23,700
1937	2–10–37	22.65	16,700
1938	3– 4–38	25.75	20,500
1939	2– 3–39	35.90	34,400
1940	4–20–40	13.26	7,370
1941	3–12–41	14.75	8,720
1942	8– 5–42	18.95	12,800
1943	12–30–42	30.75	27,000
1944	4–12–44	23.23	17,300
1945	3– 6–45	28.52	24,000
1946	1– 8–46	33.88	31,400
1947	1–21–48	18.68	12,200
1948	2–14–48	33.73	31,100
1949	3–19–49	21.08	14,500
1950	2– 2–50	34.16	31,800
1951	2– 1–51	30.90	27,200
1952	3–23–52	30.42	26,500
1953	5–20–53	25.27	19,500
1954	17–22–54	21.43	14,400
1955	2–28–55	40.60	44,600
1956	4–15–56	34.70	30,000
1957	1–30–57	43.88	61,300
1958	5– 7–58	41.25	46,800
1959	4–13–59	22.96	14,600
1960	11–29–59	16.98	8,900
1961	2–26–61	25.17	17,000
1962	2–27–62	38.22	39,500
1963	3–13–63	45.65	69,600
1964	3– 9–64	22.96	13,700
1965	3–27–65	33.78	28,200
1966	5– 2–66	27.48	19,000
1967	3– 7–67	43.30	59,000
1968	5–28–68	27.93	19,600
1969	1–21–69	13.63	6,760
1970	12–31–69	35.66	32,200
1971	5– 8–71	33.06	27,000
1972	2–26–72	40.25	46,800
1973	3–17–73	36.56	34,600
1974	1–11–74	41.85	53,000

Table B-4. —*Annual maximum discharge and gage height for station 03214000 Tug Fork at Kermit, West Virginia*—Continued

Water year	*Date*	*Gage height (ft)*	*Peak discharge (ft^3/s)*
1975	3–15–75	35.24	31,200
1976	1– 1–76	20.30	11,200
1977	4– 6–77	52.91	104,000
1978	1–27–78	39.60	44,300

Table B-5.—*Maximum, minimum, and average discharges for gaging stations in Tug Fork basin*

Station number	*Name*	*Period*	*Discharge (ft^3/s)*		
			Maximum	*Minumum*	*Average*
03213000	Tug Fork at Litwar, WV	1930–1978	54,500	11	550
03213500	Panther Creek near Panther, WV.	1946–1978	6,000	0	36.5
03213700	Tug Fork at Williamson, WV	1967–1978	94,000	59	1,196
03214000	Tug Fork near Kermit, WV	1934–1978	104,000	23	1,404
03214900	Tug Fork at Glenhayes, WV.	1976–1978	48,000	125	(a)

[a] Not determined.

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*

February 27–March 2, 1955

(Maximum discharge=21,000 ft^3/s, gage height=13.95 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–27–55	0100	3.70	1,510	3– 1–55	0100	11.18	15,200
	0200	3.84	1,670		0200	10.64	14,000
	0300	4.05	1,910		0300	10.05	12,800
	0400	4.28	2,200		0400	9.46	11,600
	0500	4.59	2,630		0500	9.02	10,600
	0600	5.27	3,650		0600	8.60	9,760
	0700	6.16	5,090		0700	8.26	9,050
	0800	6.86	6,320		0800	8.08	8,690
	0900	7.54	7,610		0900	7.96	8,450
	1000	8.46	9,470		1000	7.92	8,370
	1100	9.61	11,900		1100	8.04	8,610
	1200	10.60	14,000		1200	8.20	8,930
	1300	11.42	15,700		1300	8.40	9,340
	1400	11.95	16,800		1400	8.75	10,100
	1500	12.65	18,300		1500	9.50	11,700
	1600	13.18	19,400		1600	10.48	13,700
	1700	13.46	20,000		1700	11.35	15,500
	1800	13.82	20,700		1800	12.18	17,300
	1900	13.95	21,000		1900	12.32	17,600
	2000	13.56	20,200		2000	11.95	16,800
	2100	12.91	18,800		2100	11.18	15,200
	2200	12.08	17,100		2200	10.54	13,800
	2300	11.11	15,000		2300	9.86	12,400
	2400	10.25	13,200		2400	9.30	11,200
2–28–55	0100	9.51	11,700	3– 2–55	0100	8.84	10,300
	0200	8.85	10,300		0200	8.42	9,380
	0300	8.27	9,070		0300	8.08	8,690
	0400	7.94	8,410		0400	7.78	8,090
	0500	7.68	7,890		0500	7.50	7,530
	0600	7.53	7,590		0600	7.26	7,060
	0700	7.50	7,530		0700	7.09	6,740
	0800	7.63	7,790		0800	6.90	6,390
	0900	7.76	8,050		0900	6.75	6,120
	1000	8.00	8,530		1000	6.62	5,890
	1100	8.30	9,130		1100	6.48	5,640
	1200	8.68	9,930		1200	6.38	5,460
	1300	9.22	11,100		1300	6.26	5,260
	1400	9.95	12,600		1400	6.16	5,090
	1500	10.68	14,100		1500	6.08	4,950
	1600	11.54	15,900		1600	6.00	4,810
	1700	12.22	17,400		1700	5.91	4,660
	1800	12.58	18,100		1800	5.84	4,550
	1900	12.73	18,400		1900	5.78	4,450
	2000	12.65	18,300		2000	5.68	4,290
	2100	12.64	18,200		2100	5.64	4,230
	2200	12.44	17,800		2200	5.08	3,370
	2300	12.15	17,200		2300	5.02	3,270
	2400	11.75	16,400		2400	5.45	3,920

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

January 28–31, 1957

(Maximum discharge=35,700 ft³/s, gage height=21.60 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–28–57	0100	3.29	1,190
	0200	3.37	1,280
	0300	3.44	1,350
	0400	3.54	1,450
	0500	3.65	1,580
	0600	3.81	1,760
	0700	3.93	1,890
	0800	4.09	2,080
	0900	4.27	2,300
	1000	4.46	2,530
	1100	4.61	2,710
	1200	4.86	3,060
	1300	5.18	3,520
	1400	5.41	3,870
	1500	5.66	4,260
	1600	5.89	4,630
	1700	6.01	4,830
	1800	6.15	5,070
	1900	6.25	5,240
	2000	6.36	5,430
	2100	6.48	5,640
	2200	6.56	5,780
	2300	6.66	5,960
	2400	6.73	6,080
1–29–57	0100	6.77	6,160
	0200	6.78	6,170
	0300	6.75	6,120
	0400	6.75	6,120
	0500	6.85	6,300
	0600	7.02	6,610
	0700	7.27	7,080
	0800	7.63	7,770
	0900	7.34	7,220
	1000	9.35	11,200
	1100	10.61	13,700
	1200	12.25	17,000
	1300	14.03	20,600
	1400	15.66	23,800
	1500	17.12	26,700
	1600	18.35	29,200
	1700	19.60	31,700
	1800	20.82	34,100
	1900	21.60	35,700
	2000	21.55	35,600
	2100	20.01	32,500
	2200	19.88	32,300
1–29–57	2300	18.62	29,700
	2400	17.25	27,000
1–30–57	0100	16.59	25,700
	0200	15.58	23,700
	0300	14.43	21,400
	0400	13.40	19,300
	0500	12.50	17,500
	0600	11.58	15,700
	0700	10.74	14,000
	0800	10.00	12,500
	0900	9.44	11,400
	1000	8.94	10,400
	1100	8.49	9,480
	1200	8.19	8,880
	1300	7.80	8,100
	1400	7.57	7,650
	1500	7.30	7,140
	1600	7.04	6,650
	1700	6.82	6,250
	1800	6.66	5,960
	1900	6.52	5,710
	2000	6.41	5,520
	2100	6.30	5,330
	2200	6.20	5,150
	2300	6.12	5,020
	2400	6.04	4,880
1–31–57	0100	5.84	4,550
	0200	5.79	4,470
	0300	5.71	4,340
	0400	5.67	4,270
	0500	5.61	4,180
	0600	5.56	4,100
	0700	5.49	3,990
	0800	5.46	3,950
	0900	5.44	3,920
	1000	5.41	3,870
	1100	5.41	3,870
	1200	5.41	3,870
	1300	5.37	3,810
	1400	5.37	3,810

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

May 5–10, 1958

(Maximum discharge=13,700 ft³/s, gage height=10.60 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
5– 5–58	0100	3.87	1,920	5– 7–58	0100	7.46	7,460
	0200	3.93	1,990		0200	7.38	7,300
	0300	3.99	2,050		0300	7.32	7,190
	0400	4.02	2,090		0400	7.27	7,090
	0500	4.10	2,180		0500	7.17	6,900
	0600	4.19	2,280		0600	7.11	6,780
	0700	4.27	2,370		0700	6.98	6,530
	0800	4.33	2,440		0800	6.93	6,440
	0900	4.38	2,500		0900	6.83	6,260
	1000	4.46	2,600		1000	6.77	6,160
	1100	4.57	2,730		1100	6.70	6,030
	1200	4.66	2,840		1200	6.64	5,920
	1300	4.87	3,120		1300	6.61	5,870
	1400	5.18	3,550		1400	6.57	5,800
	1500	5.49	4,010		1500	6.54	5,740
	1600	5.84	4,560		1600	6.44	5,570
	1700	6.09	4,960		1700	6.37	5,450
	1800	6.43	5,550		1800	6.34	5,390
	1900	6.88	6,350		1900	6.29	5,310
	2000	7.24	7,030		2000	6.26	5,260
	2100	7.36	7,260		2100	6.21	5,170
	2200	7.46	7,460		2200	6.17	5,100
	2300	7.39	7,320		2300	6.14	5,050
	2400	7.33	7,210		2400	6.12	5,010
5– 6–58	0100	7.26	7,070	5– 8–58	0100	6.05	4,900
	0200	7.19	6,940		0200	6.05	4,900
	0300	7.15	6,860		0300	5.97	4,770
	0400	7.13	6,820		0400	5.94	4,720
	0500	7.16	6,880		0500	5.86	4,590
	0600	7.41	7,360		0600	5.84	4,560
	0700	7.78	8,080		0700	5.76	4,430
	0800	8.18	8,860		0800	5.76	4,430
	0900	8.67	9,840		0900	5.71	4,350
	1000	9.16	10,800		1000	5.68	4,300
	1100	9.69	11,900		1100	5.66	4,270
	1200	10.12	12,700		1200	5.61	4,190
	1300	10.49	13,500		1300	5.52	4,060
	1400	10.60	13,700		1400	4.53	4,070
	1500	10.42	13,300		1500	5.48	3,990
	1600	10.07	12,600		1600	5.44	3,930
	1700	9.62	11,700		1700	5.41	3,890
	1800	9.30	11,100		1800	5.44	3,930
	1900	8.88	10,300		1900	5.45	3,950
	2000	8.58	9,660		2000	5.35	3,800
	2100	8.41	9,320		2100	5.31	3,740
	2200	8.12	8,740		2200	5.21	3,590
	2300	7.88	8,270		2300	5.14	3,490
	2400	7.69	7,900		2400	5.15	3,510

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

May 5–10, 1958—Continued

(Maximum discharge=13,700 ft^3/s, gage height=10.60 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
5– 8–58	0100	6.05	4,900	5– 9–58	1000	5.23	3,620
	0200	6.05	4,900		1100	5.26	3,660
	0300	5.97	4,770		1200	5.31	3,740
	0400	5.94	4,720		1300	5.33	3,770
	0500	5.86	4,590		1400	5.36	3,810
	0600	5.84	4,560		1500	5.38	3,840
	0700	5.76	4,430		1600	5.46	3,960
	0800	5.76	4,430		1700	5.48	3,990
	0900	5.71	4,350		1800	5.50	4,030
	1000	5.68	4,300		1900	5.51	4,040
	1100	5.66	4,270		2000	5.51	4,040
	1200	5.61	4,190		2100	5.52	4,060
	1300	5.52	4,060		2200	5.57	4,130
	1400	4.53	4,070		2300	5.59	4,160
	1500	5.48	3,990		2400	5.61	4,190
	1600	5.44	3,930				
	1700	5.41	3,890	5–10–58	0100	4.36	2,470
	1800	5.44	3,930		0200	4.34	2,450
	1900	5.45	3,950		0300	4.32	2,420
	2000	5.35	3,800		0400	4.30	2,400
	2100	5.31	3,740		0500	4.28	2,380
	2200	5.21	3,590		0600	4.26	2,360
	2300	5.14	3,490		0700	4.24	2,330
	2400	5.15	3,510		0800	4.16	2,240
					0900	4.16	2,240
5– 9–58	0100	5.12	3,460		1000	4.14	2,220
	0200	5.05	3,360		1100	4.14	2,220
	0300	5.02	3,320		1200	4.14	2,220
	0400	5.03	3,330		1300	4.14	2,220
	0500	5.08	3,400		1400	4.12	2,200
	0600	5.16	3,520		1500	4.12	2,200
	0700	5.14	3,490		1600	4.06	2,130
	0800	5.22	3,610		1700	4.06	2,130
	0900	5.23	3,620		1800	4.06	2,130

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

March 11–15, 1963

(Maximum discharge=28,400 ft^3/s, gage height=17.89 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3–11–63	0100	3.10	1,180	3–13–63	0100	8.38	10,900
	0200	3.09	1,170		0200	8.03	10,200
	0300	3.07	1,150		0300	7.71	9,460
	0400	3.07	1,150		0400	7.43	8,850
	0500	3.06	1,140		0500	7.14	8,210
	0600	3.06	1,140		0600	6.92	7,690
	0700	3.06	1,140		0700	6.74	7,210
	0800	3.06	1,140		0800	6.55	6,700
	0900	3.06	1,140		0900	6.38	6,250
	1000	3.10	1,180		1000	6.24	5,870
	1100	3.14	1,220		1100	6.13	5,580
	1200	3.17	1,260		1200	6.02	5,340
	1300	3.20	1,290		1300	5.91	5,120
	1400	3.24	1,340		1400	5.81	4,930
	1500	3.29	1,400		1500	5.72	4,760
	1600	3.46	1,600		1600	5.63	4,590
	1700	3.73	1,950		1700	5.54	4,420
	1800	4.09	2,420		1800	5.47	4,300
	1900	4.48	2,920		1900	5.39	4,160
	2000	4.83	3,380		2000	5.33	4,070
	2100	5.30	4,020		2100	5.27	3,980
	2200	5.87	5,040		2200	5.21	3,890
	2300	6.75	7,230		2300	5.16	3,810
	2400	7.75	9,550		2400	5.09	3,720
3–12–63	0100	9.00	12,100	3–14–63	0100	5.04	3,650
	0200	10.43	14,800		0200	4.97	3,560
	0300	12.27	18,000		0300	4.92	3,500
	0400	13.91	20,800		0400	4.86	3,420
	0500	15.16	23,000		0500	4.81	3,350
	0600	15.97	24,600		0600	4.77	3,300
	0700	16.59	25,800		0700	4.73	3,250
	0800	17.08	26,800		0800	4.68	3,180
	0900	17.48	27,600		0900	4.65	3,150
	1000	17.89	28,400		1000	4.62	3,110
	1100	17.54	27,700		1100	4.57	3,040
	1200	17.40	27,400		1200	4.54	3,000
	1300	16.75	26,200		1300	4.51	2,960
	1400	16.47	25,600		1400	4.47	2,910
	1500	15.54	23,800		1500	4.43	2,860
	1600	14.40	21,700		1600	4.39	2,810
	1700	13.78	20,600		1700	4.37	2,780
	1800	12.87	19,000		1800	4.34	2,740
	1900	11.95	17,400		1900	4.32	2,720
	2000	11.22	16,200		2000	4.29	2,680
	2100	10.57	15,000		2100	4.27	2,650
	2200	9.88	13,800		2200	4.23	2,600
	2300	9.33	12,700		2300	4.20	2,560
	2400	8.87	11,900		2400	4.18	2,530

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

March 11–15, 1963—Continued

(Maximum discharge=28,400 ft^3/s, gage height=17.89 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3–15–63	0100	4.16	2,510	3–15–63	1300	3.90	2,170
	0200	4.13	2,470		1400	3.88	2,140
	0300	4.11	2,440		1500	3.86	2,120
	0400	4.08	2,400		1600	3.84	2,090
	0500	4.07	2,390		1700	3.84	2,090
	0600	4.05	2,370		1800	3.83	2,080
	0700	4.02	2,330		1900	3.81	2,050
	0800	4.00	2,300		2000	3.79	2,030
	0900	3.98	2,270		2100	3.78	2,010
	1000	3.96	2,250		2200	3.77	2,000
	1100	3.94	2,220		2300	3.76	1,990
	1200	3.92	2,200		2400	3.75	1,980

March 6–9, 1967

(Maximum discharge=20,700 ft^3/s, gage height=13.99 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3– 6–67	0100	2.84	1,390	3– 7–67	0100	10.64	14,300
	0200	2.84	1,390		0200	12.07	17,000
	0300	2.85	1,400		0300	13.04	18,900
	0400	2.86	1,410		0400	13.58	19,900
	0500	2.87	1,420		0500	13.86	20,400
	0600	2.93	1,500		0600	13.99	20,700
	0700	2.99	1,570		0700	13.87	20,500
	0800	3.06	1,650		0800	13.79	20,300
	0900	3.15	1,760		0900	13.73	20,200
	1000	3.25	1,880		1000	13.33	19,400
	1100	3.36	2,010		1100	12.75	18,300
	1200	3.50	2,180		1200	12.03	17,000
	1300	3.67	2,380		1300	11.26	15,500
	1400	3.86	2,610		1400	10.43	13,900
	1500	4.06	2,860		1500	9.59	12,300
	1600	4.28	3,140		1600	9.05	11,300
	1700	4.52	3,470		1700	8.53	10,300
	1800	4.74	3,780		1800	8.02	9,340
	1900	5.00	4,150		1900	7.64	8,620
	2000	5.41	4,810		2000	7.23	7,860
	2100	6.03	5,800		2100	6.94	7,350
	2200	6.74	7,010		2200	6.58	6,740
	2300	7.68	8,690		2300	6.35	6,340
	2400	9.07	11,300		2400	6.12	5,950

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

March 6–9, 1967—Continued

(Maximum discharge=20,700 ft^3/s, gage height=13.99 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3– 8–67	0100	5.95	5,670	3– 9–67	0100	4.13	2,950
	0200	5.82	5,460		0200	4.09	2,900
	0300	5.65	5,190		0300	4.05	2,850
	0400	5.52	4,980		0400	4.01	2,790
	0500	5.40	4,790		0500	3.98	2,760
	0600	5.30	4,630		0600	3.94	2,710
	0700	5.20	4,470		0700	3.91	2,670
	0800	5.09	4,290		0800	3.88	2,640
	0900	5.02	4,180		0900	3.86	2,610
	1000	4.95	4,080		1000	3.83	2,580
	1100	4.86	3,940		1100	3.79	2,530
	1200	4.78	3,830		1200	3.76	2,490
	1300	4.71	3,730		1300	3.74	2,470
	1400	4.66	3,660		1400	3.71	2,430
	1500	4.60	3,580		1500	3.69	2,410
	1600	4.54	3,500		1600	3.65	2,360
	1700	4.49	3,430		1700	3.63	2,340
	1800	4.44	3,360		1800	3.61	2,310
	1900	4.39	3,290		1900	3.59	2,290
	2000	4.34	3,220		2000	3.57	2,260
	2100	4.31	3,180		2100	3.55	2,240
	2200	4.26	3,120		2200	3.53	2,220
	2300	4.22	3,070		2300	3.51	2,190
	2400	4.16	2,990		2400	3.48	2,160

February 24 – March 1, 1972

(Maximum discharge=15,000 ft^3/s, gage height=10.99 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–24–72	0100	3.16	1,610	2–24–72	1300	6.92	7,310
	0200	3.17	1,620		1400	7.28	7,950
	0300	3.18	1,640		1500	7.74	8,810
	0400	3.21	1,670		1600	8.19	9,660
	0500	3.27	1,740		1700	8.54	10,300
	0600	3.39	1,890		1800	8.80	10,800
	0700	3.62	2,170		1900	8.96	11,100
	0800	4.06	2,780		2000	9.14	11,500
	0900	4.74	3,760		2100	9.33	11,800
	1000	5.44	4,850		2200	9.53	12,200
	1100	5.97	5,700		2300	9.73	12,600
	1200	6.49	6,580		2400	9.98	13,100

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

February 24–March 1, 1972—Continued

(Maximum discharge=15,000 ft³/s, gage height=10.99 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
2–25–72	0100	10.20	13,500	2–27–72	0100	7.26	7,920
	0200	10.45	14,000		0200	6.99	7,430
	0300	10.69	14,400		0300	6.76	7,040
	0400	10.89	14,800		0400	6.56	6,700
	0500	10.98	15,000		0500	6.38	6,400
	0600	10.99	15,000		0600	6.22	6,120
	0700	10.81	14,600		0700	6.07	5,870
	0800	10.45	14,000		0800	5.93	5,640
	0900	9.99	13,100		0900	5.82	5,460
	1000	9.35	11,900		1000	5.72	5,300
	1100	8.96	11,100		1100	5.62	5,140
	1200	8.63	10,500		1200	5.52	4,980
	1300	8.24	9,760		1300	5.45	4,870
	1400	7.87	9,050		1400	5.38	4,760
	1500	7.46	8,280		1500	5.31	4,650
	1600	7.14	7,700		1600	5.23	4,520
	1700	6.83	7,160		1700	5.16	4,410
	1800	6.58	6,740		1800	5.10	4,310
	1900	6.35	6,340		1900	5.03	4,200
	2000	6.14	5,990		2000	4.98	4,120
	2100	5.98	5,720		2100	4.93	4,050
	2200	5.85	5,510		2200	4.88	3,970
	2300	5.73	5,320		2300	4.84	3,910
	2400	5.68	5,240		2400	4.79	3,840
2–26–72	0100	5.68	5,240	2–28–72	0100	4.75	3,780
	0200	5.67	5,220		0200	4.70	3,700
	0300	5.79	5,410		0300	4.66	3,640
	0400	5.88	5,560		0400	4.62	3,580
	0500	6.07	5,870		0500	4.58	3,520
	0600	6.31	6,280		0600	4.54	3,460
	0700	6.58	6,740		0700	4.50	3,400
	0800	6.89	7,260		0800	4.46	3,340
	0900	7.25	7,900		0900	4.42	3,290
	1000	7.53	8,410		1000	4.39	3,250
	1100	7.88	9,070		1100	4.35	3,190
	1200	8.20	9,680		1200	4.32	3,150
	1300	8.54	10,300		1300	4.29	3,110
	1400	8.77	10,800		1400	4.26	3,060
	1500	8.89	11,000		1500	4.23	3,020
	1600	8.87	11,000		1600	4.21	2,990
	1700	8.81	10,800		1700	4.18	2,950
	1800	8.75	10,700		1800	4.15	2,910
	1900	8.64	10,500		1900	4.12	2,870
	2000	8.40	10,100		2000	4.09	2,830
	2100	8.21	9,700		2100	4.06	2,780
	2200	7.99	9,280		2200	4.03	2,740
	2300	7.71	8,750		2300	4.00	2,700
	2400	7.47	8,300		2400	3.98	2,670

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

February 24–March 1, 1972—Continued

(Maximum discharge=15,000 ft³/s, gage height=10.99 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
2–29–72	0100	3.95	2,630	3– 1–72	0100	3.47	1,980
	0200	3.92	2,590		0200	3.45	1,960
	0300	3.90	2,560		0300	3.43	1,940
	0400	3.87	2,520		0400	3.42	1,920
	0500	3.85	2,490		0500	3.40	1,900
	0600	3.83	2,460		0600	3.39	1,890
	0700	3.81	2,430		0700	3.37	1,860
	0800	3.78	2,390		0800	3.36	1,850
	0900	3.76	2,360		0900	3.34	1,830
	1000	3.74	2,340		1000	3.33	1,820
	1100	2.72	2,310		1100	3.31	1,790
	1200	3.70	2,280		1200	3.30	1,780
	1300	3.68	2,250		1300	3.29	1,770
	1400	3.66	2,220		1400	3.28	1,760
	1500	3.64	2,200		1500	3.26	1,730
	1600	3.62	2,170		1600	3.25	1,720
	1700	3.60	2,140		1700	3.24	1,710
	1800	3.58	2,120		1800	3.23	1,700
	1900	3.57	2,100		1900	3.22	1,680
	2000	3.55	2,080		2000	3.21	1,670
	2100	3.53	2,060		2100	3.20	1,660
	2200	3.51	2,030		2200	3.19	1,650
	2300	3.50	2,020		2300	3.18	1,640
	2400	3.48	2,000		2400	3.17	1,620

January 9–15, 1974

(Maximum discharge=18,600 ft³/s, gage height=16.87 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1– 9–74	0100	2.65	1,270	1– 9–74	1300	3.02	1,630
	0200	2.65	1,270		1400	3.06	1,680
	0300	2.65	1,270		1500	3.13	1,750
	0400	2.66	1,270		1600	3.19	1,820
	0500	2.68	1,290		1700	3.25	1,890
	0600	2.71	1,320		1800	3.32	1,960
	0700	2.75	1,360		1900	3.41	2,070
	0800	2.78	1,380		2000	3.48	2,160
	0900	2.83	1,430		2100	3.52	2,200
	1000	2.87	1,470		2200	3.55	2,240
	1100	2.93	1,530		2300	3.57	2,260
	1200	2.97	1,580		2400	3.58	2,280

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

January 9–15, 1974—Continued

(Maximum discharge=18,600 ft³/s, gage height=16.87 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–10–74	0100	3.59	2,290	1–12–74	0100	8.88	11,000
	0200	3.60	2,300		0200	8.55	10,300
	0300	3.61	2,310		0300	8.08	9,450
	0400	3.61	2,310		0400	7.70	8,730
	0500	3.61	2,310		0500	7.33	8,040
	0600	3.61	2,310		0600	6.99	7,430
	0700	3.68	2,400		0700	6.68	6,910
	0800	3.76	2,490		0800	6.43	6,480
	0900	3.76	2,490		0900	6.20	6,090
	1000	3.80	2,540		1000	6.03	5,800
	1100	3.95	2,720		1100	5.83	5,480
	1200	4.09	2,900		1200	5.69	5,250
	1300	4.41	3,310		1300	5.56	5,050
	1400	4.62	3,610		1400	5.45	4,870
	1500	4.72	3,750		1500	5.35	4,710
	1600	4.78	3,830		1600	5.24	4,530
	1700	4.76	3,800		1700	5.14	4,370
	1800	4.78	3,830		1800	5.05	4,230
	1900	4.79	3,850		1900	4.98	4,120
	2000	4.85	3,930		2000	4.89	3,990
	2100	4.93	4,050		2100	4.81	3,870
	2200	5.01	4,170		2200	4.74	3,780
	2300	5.12	4,340		2300	4.68	3,690
	2400	5.24	4,530		2400	4.61	3,590
1–11–74	0100	5.38	4,760	1–13–74	0100	4.56	3,520
	0200	5.52	4,980		0200	4.51	3,450
	0300	5.65	5,190		0300	4.46	3,380
	0400	5.90	5,590		0400	4.40	3,300
	0500	6.24	6,160		0500	4.36	3,250
	0600	6.70	6,940		0600	4.31	3,180
	0700	7.40	8,170		0700	4.26	3,120
	0800	8.37	10,000		0800	4.21	3,050
	0900	9.33	11,800		0900	4.18	3,010
	1000	10.18	13,400		1000	4.14	2,960
	1100	10.92	14,800		1100	4.09	2,900
	1200	11.61	16,200		1200	4.06	2,860
	1300	12.16	17,200		1300	4.03	2,820
	1400	12.59	18,000		1400	4.00	2,780
	1500	12.84	18,500		1500	3.97	2,740
	1600	12.87	18,600		1600	3.93	2,700
	1700	12.57	18,000		1700	3.90	2,660
	1800	12.23	17,300		1800	3.86	2,610
	1900	11.61	16,200		1900	3.83	2,580
	2000	10.97	14,900		2000	3.80	2,540
	2100	10.33	13,700		2100	3.78	2,520
	2200	9.75	12,600		2200	3.75	2,480
	2300	9.26	11,700		2300	3.73	2,460
	2400	8.88	11,000		2400	3.72	2,440

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

January 9–15, 1974—Continued

(Maximum discharge=18,600 ft^3/s, gage height=16.87 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
1–14–74	0100	3.70	2,420	1–15–74	0100	3.25	1,890
	0200	3.68	2,400		0200	3.24	1,870
	0300	3.66	2,370		0300	3.23	1,860
	0400	3.63	2,340		0400	3.21	1,840
	0500	3.61	2,310		0500	3.20	1,830
	0600	3.59	2,290		0600	3.19	1,820
	0700	3.56	2,250		0700	3.16	1,790
	0800	3.55	2,240		0800	3.16	1,790
	0900	3.52	2,200		0900	3.15	1,780
	1000	3.51	2,190		1000	3.14	1,760
	1100	3.48	2,160		1100	3.12	1,740
	1200	3.46	2,130		1200	3.10	1,720
	1300	3.44	2,110		1300	3.09	1,710
	1400	3.42	2,080		1400	3.08	1,700
	1500	3.40	2,060		1500	3.07	1,690
	1600	3.39	2,050		1600	3.06	1,680
	1700	3.37	2,020		1700	3.05	1,670
	1800	3.35	2,000		1800	3.03	1,640
	1900	3.34	1,990		1900	3.02	1,630
	2000	3.32	1,960		2000	3.01	1,620
	2100	3.31	1,950		2100	3.00	1,610
	2200	3.30	1,940		2200	2.99	1,600
	2300	3.28	1,920		2300	2.98	1,590
	2400	3.27	1,910		2400	2.96	1,570

April 3–6, 1977

(Maximum dishcarge=54,500 ft^3/s, gage height=27.37 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
4– 3–77	0100	1.74	434	4– 3–77	1300	2.22	798
	0200	1.76	446		1400	2.26	834
	0300	1.81	477		1500	2.30	870
	0400	1.86	512		1600	2.34	910
	0500	1.91	547		1700	2.38	950
	0600	1.97	589		1800	2.43	1,000
	0700	2.02	626		1900	2.47	1,040
	0800	2.06	658		2000	2.49	1,060
	0900	2.10	690		2100	2.50	1,070
	1000	2.14	726		2200	2.52	1,090
	1100	2.16	744		2300	2.52	1,090
	1200	2.19	771		2400	2.54	1,110

Table B-6.—*Hourly gage height and discharge for selected days at gaging station 03213000 Tug Fork at Litwar, West Virginia*—Continued

April 3–6, 1977

(Maximum discharge-54,500 ft^3/s, gage height=27.37 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
4– 4–77	0100	2.59	1,160
	0200	2.65	1,230
	0300	2.75	1,340
	0400	2.89	1,490
	0500	3.11	1,730
	0600	3.36	2,010
	0700	3.91	2,670
	0800	5.56	5,050
	0900	6.61	6,790
	1000	7.90	9,110
	1100	9.64	12,400
	1200	11.33	15,600
	1300	13.01	18,800
	1400	15.03	22,700
	1500	17.72	27,900
	1600	20.66	34,700
	1700	23.44	42,300
	[a]1800	26.00	50,000
	1900	27.30	54,300
	2000	27.37	54,500
	2100	27.30	54,300
	2200	27.15	53,800
	2300	25.50	48,500
	2400	24.00	44,000
4– 5–77	0100	22.25	38,800
	0200	20.50	34,300
	0300	18.75	30,000
	0400	17.00	26,500
	0500	15.50	23,600
	0600	14.90	22,400
	0700	14.65	21,900
	0800	14.40	21,500
	0900	14.15	21,000
	1000	13.90	20,500
	1100	13.65	20,000
	1200	13.40	19,600
4– 5–77	1300	13.15	19,100
	1400	12.90	18,600
	1500	12.65	18,100
	1600	12.40	17,700
	1700	12.15	17,200
	1800	11.90	16,700
	1900	11.65	16,200
	2000	11.40	15,800
	2100	11.15	15,300
	2200	10.90	14,800
	2300	10.65	14,300
	2400	10.40	13,900
4– 6–77	0100	10.15	13,400
	0200	9.90	12,900
	0300	9.65	12,400
	0400	9.40	12,000
	0500	9.15	11,500
	0600	8.90	11,000
	0700	8.65	10,500
	0800	8.40	10,100
	0900	8.15	9,580
	1000	7.90	9,110
	1100	7.65	8,630
	1200	7.40	8,170
	1300	7.30	7,990
	1400	7.20	7,810
	1500	7.10	7,630
	1600	7.00	7,450
	1700	6.90	7,280
	1800	6.80	7,110
	1900	6.70	6,940
	2000	6.60	6,770
	2100	6.50	6,600
	2200	6.40	6,430
	2300	6.30	6,260
	2400	6.20	6,090

[a] Gage height and discharges from 1800 April 4 through 2400 April 6 are estimated.

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*

February 27–March 2, 1955

(Maximum discharge=3,570 ft^3/s, gage height=8.56 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–27–55	0100	4.60	439	3– 1–55	0100	5.68	843
	0200	4.80	490		0200	5.53	775
	0300	4.39	385		0300	5.42	724
	0400	4.60	439		0400	5.30	672
	0500	4.80	490		0500	5.18	622
	0600	5.20	630		0600	5.08	585
	0700	5.70	852		0700	5.05	574
	0800	6.08	1,030		0800	5.19	626
	0900	6.70	1,420		0900	5.83	912
	1000	7.08	1,740		1000	6.36	1,180
	1100	8.05	2,880		1100	6.49	1,250
	1200	8.28	3,190		1200	6.51	1,270
	1300	7.84	2,620		1300	6.48	1,250
	1400	7.50	2,200		1400	6.40	1,210
	1500	7.10	1,760		1500	6.26	1,130
	1600	6.78	1,490		1600	6.05	1,020
	1700	6.52	1,280		1700	5.95	967
	1800	6.28	1,140		1800	5.76	880
	1900	6.06	1,020		1900	5.62	816
	2000	5.90	944		2000	5.48	752
	2100	5.72	862		2100	5.42	724
	2200	5.44	733		2200	5.28	664
	2300	5.38	706		2300	5.16	615
	2400	5.22	638		2400	5.06	577
2–28–55	0100	5.08	585	3– 2–55	0100	4.96	542
	0200	4.96	542		0200	4.84	503
	0300	4.85	506		0300	4.75	477
	0400	4.80	490		0400	4.68	459
	0500	4.80	490		0500	4.60	439
	0600	5.53	775		0600	4.53	421
	0700	6.18	1,090		0700	4.46	403
	0800	6.73	1,450		0800	4.38	382
	0900	7.01	1,680		0900	4.33	369
	1000	7.03	1,700		1000	4.27	354
	1100	6.99	1,670		1100	4.22	341
	1200	6.99	1,670		1200	4.18	331
	1300	7.25	1,920		1300	4.12	315
	1400	7.87	2,660		1400	4.06	300
	1500	8.56	3,580		1500	4.02	290
	1600	8.25	3,150		1600	3.97	279
	1700	7.94	2,740		1700	3.94	273
	1800	7.44	2,130		1800	3.90	265
	1900	7.07	1,730		1900	3.86	257
	2000	6.77	1,480		2000	3.82	249
	2100	6.49	1,250		2100	3.78	240
	2200	6.27	1,140		2200	3.76	236
	2300	6.05	1,020		2300	3.72	228
	2400	5.87	930		2400	3.69	222

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

January 28–30, 1957

(Maximum discharge=4,900 ft³/s, gage height=9.50 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–28–57	0100	3.42	170	1–29–57	1300	9.03	4,240
	0200	3.58	200		1400	8.54	3,560
	0300	3.70	224		1500	8.25	3,150
	0400	3.86	257		1600	7.95	2,760
	0500	4.04	295		1700	7.69	2,440
	0600	4.18	331		1800	7.42	2,100
	0700	4.32	367		1900	7.27	1,940
	0800	4.44	397		2000	7.10	1,760
	0900	4.54	423		2100	6.75	1,470
	1000	4.60	439		2200	6.55	1,300
	1100	4.65	451		2300	6.24	1,120
	1200	4.68	459		2400	6.02	1,000
	1300	4.72	469				
	1400	4.76	480	1–30–57	0100	5.83	912
	1500	4.82	496		0200	5.67	839
	1600	4.88	516		0300	5.52	770
	1700	4.95	539		0400	5.39	711
	1800	5.00	555		0500	5.23	643
	1900	5.00	555		0600	5.12	600
	2000	5.00	555		0700	4.99	552
	2100	4.96	542		0800	4.86	509
	2200	4.94	535		0900	4.76	480
	2300	4.90	522		1000	4.65	451
	2400	4.86	509		1100	4.56	428
					1200	4.47	405
1–29–57	0100	4.86	509		1300	4.41	390
	0200	4.87	513		1400	4.34	372
	0300	4.93	532		1500	4.28	356
	0400	5.13	604		1600	4.22	341
	0500	5.90	944		1700	4.17	328
	0600	6.95	1,630		1800	4.11	313
	0700	7.70	2,450		1900	4.07	302
	0800	8.13	2,980		2000	4.00	285
	0900	8.50	3,500		2100	3.95	275
	1000	8.96	4,140		2200	3.89	263
	1100	9.50	4,900		2300	3.84	253
	1200	9.38	4,730		2400	3.82	249

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

May 6–8, 1958

(Maximum discharge=1,350 ft³/s, gage height=6.60 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
5- 6–58	0100	4.84	516
	0200	4.92	538
	0300	5.12	596
	0400	5.27	645
	0500	5.38	685
	0600	5.51	734
	0700	5.58	766
	0800	5.64	794
	0900	5.65	799
	1000	5.64	794
	1100	5.61	780
	1200	5.56	757
	1300	5.51	734
	1400	5.43	704
	1500	5.34	670
	1600	5.27	645
	1700	5.23	632
	1800	5.28	648
	1900	5.43	704
	2000	5.65	799
	2100	6.02	987
	2200	6.33	1,170
	2300	6.48	1,270
	2400	6.56	1,320
5- 7–58	0100	6.60	1,350
	0200	6.55	1,320
	0300	6.44	1,240
	0400	6.30	1,160
	0500	6.14	1,060
	0600	6.01	982
	0700	5.88	913
	0800	5.72	832
	0900	5.59	770
	1000	5.48	722
	1100	5.36	677
	1200	5.28	648
5- 7–58	1300	5.20	622
	1400	5.11	593
	1500	5.02	566
	1600	4.95	546
	1700	4.87	524
	1800	4.80	505
	1900	4.73	486
	2000	4.65	465
	2100	4.57	444
	2200	4.50	426
	2300	4.44	411
	2400	4.39	399
5- 8–58	0100	4.35	389
	0200	4.30	376
	0300	4.25	364
	0400	4.21	354
	0500	4.16	343
	0600	4.14	338
	0700	4.09	326
	0800	4.05	317
	0900	3.94	291
	1000	3.89	280
	1100	3.87	276
	1200	3.84	269
	1300	3.82	264
	1400	3.79	258
	1500	3.77	253
	1600	3.73	245
	1700	3.69	236
	1800	3.67	232
	1900	3.64	225
	2000	3.61	219
	2100	3.58	213
	2200	3.53	203
	2300	3.52	201
	2400	3.48	193

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

March 11–15, 1963

(Maximum discharge=4,570 ft^3/s, gage height=10.67 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3–11–63	0800	2.37	42
	0900	2.33	39
	1000	2.41	45
	1100	2.47	50
	1200	2.54	56
	1300	2.68	69
	1400	2.81	83
	1500	2.87	90
	1600	2.97	103
	1700	3.24	144
	1800	3.82	254
	1900	4.62	456
	2000	5.31	711
	2100	5.99	1,040
	2200	6.54	1,370
	2300	7.49	1,990
	2400	8.69	2,950
3–12–63	0100	9.55	3,640
	0200	10.67	4,570
	0300	10.56	4,470
	0400	10.49	4,410
	0500	10.08	4,060
	0600	9.62	3,700
	0700	9.14	3,310
	0800	8.55	2,840
	0900	8.08	2,460
	1000	7.58	2,060
	1100	7.13	1,740
	1200	6.83	1,550
	1300	6.58	1,390
	1400	6.35	1,250
	1500	6.17	1,140
	1600	5.97	1,030
	1700	5.80	936
	1800	5.63	854
	1900	5.48	785
	2000	5.33	720
	2100	5.20	666
	2200	5.08	618
	2300	4.94	565
	2400	4.85	532
3–13–63	0100	4.77	511
	0200	4.67	481
	0300	4.57	451
3–13–63	0400	4.49	427
	0500	4.43	409
	0600	4.35	385
	0700	4.28	364
	0800	4.19	337
	0900	4.14	322
	1000	4.07	301
	1100	4.02	286
	1200	3.96	268
	1300	3.91	253
	1400	3.86	240
	1500	3.81	227
	1600	3.76	215
	1700	3.72	206
	1800	3.67	196
	1900	3.63	188
	2000	3.58	178
	2100	3.54	171
	2200	3.50	164
	2300	3.46	158
	2400	3.43	153
[a]3–14–63	0100	3.38	145
	0200	3.35	140
	0300	3.32	136
	0400	3.28	130
	0500	3.26	127
	0600	3.23	123
	0700	3.20	119
	0800	3.17	115
	0900	3.14	111
	1000	3.12	109
	1100	3.08	104
	1200	3.05	100
	1300	3.03	98
	1400	3.00	94
	1500	2.98	92
	1600	2.96	89
	1700	2.94	87
	1800	2.92	84
	1900	2.90	82
	2000	2.88	80
	2100	2.86	78
	2200	2.84	75
	2300	2.83	74
	2400	2.81	72

[a] Gage height and discharge estimated.

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

March 11–15, 1963—Continued

(Maximum discharge=4,570 ft^3/s, gage height=10.67 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
[a]3–15–63	0100	2.79	70	3–15–63	1300	2.64	56
	0200	2.78	69		1400	2.63	55
	0300	2.76	67		1500	2.62	54
	0400	2.75	66		1600	2.61	53
	0500	2.74	65		1700	2.60	52
	0600	2.72	63		1800	2.59	51
	0700	2.71	62		1900	2.58	50
	0800	2.70	61		2000	2.57	50
	0900	2.69	60		2100	2.57	50
	1000	2.68	59		2200	2.56	49
	1100	2.66	57		2300	2.55	48
	1200	2.65	56		2400	2.54	47

March 6–9, 1967

(Maximum discharge=4,600 ft^3/s, gage height=10.71 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3– 6–67	0100	3.21	67	3– 7–67	0100	10.71	4,600
	0200	3.25	71		0200	10.00	3,750
	0300	3.32	78		0300	9.26	3,010
	0400	3.39	87		0400	8.65	2,470
	0500	3.46	95		0500	8.09	2,020
	0600	3.53	104		0600	7.59	1,620
	0700	3.61	113		0700	7.20	1,370
	0800	3.69	125		0800	6.84	1,160
	0900	3.79	140		0900	6.57	1,030
	1000	3.93	166		1000	6.33	905
	1100	4.12	204		1100	6.12	800
	1200	4.41	262		1200	5.91	714
	1300	4.72	340		1300	5.75	650
	1400	4.97	402		1400	5.61	594
	1500	5.32	506		1500	5.49	557
	1600	5.43	539		1600	5.36	518
	1700	5.52	566		1700	5.26	488
	1800	5.57	581		1800	5.16	458
	1900	5.72	638		1900	5.08	434
	2000	6.27	875		2000	4.95	397
	2100	7.25	1,400		2100	4.87	377
	2200	8.99	2,800		2200	4.82	365
	2300	10.00	3,750		2300	4.76	350
	2400	10.60	4,400		2400	4.74	345

[a]Gage height and discharge estimated.

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

March 6–9, 1967—Continued

(Maximum discharge-4,600 ft³/s, gage height=10.71 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
3– 8–67	0100	4.69	332	3– 9–67	0100	3.89	158
	0200	4.66	325		0200	3.87	155
	0300	4.62	315		0300	3.85	151
	0400	4.58	305		0400	3.87	155
	0500	4.57	302		0500	3.89	158
	0600	4.52	290		0600	3.88	156
	0700	4.48	280		0700	3.86	153
	0800	4.44	270		0800	3.84	149
	0900	4.41	262		0900	3.76	136
	1000	4.37	254		1000	3.74	133
	1100	4.34	248		1100	3.71	128
	1200	4.32	244		1200	3.69	125
	1300	4.31	242		1300	3.68	124
	1400	4.27	234		1400	3.67	122
	1500	4.24	228		1500	3.67	122
	1600	4.14	208		1600	3.67	122
	1700	4.12	204		1700	3.67	122
	1800	4.07	194		1800	3.66	121
	1900	4.03	186		1900	3.64	118
	2000	4.01	182		2000	3.62	115
	2100	3.98	176		2100	3.59	111
	2200	3.95	170		2200	3.58	110
	2300	3.93	166		2300	3.57	108
	2400	3.91	162		2400	3.55	106

February 22–29, 1972

(Maximum discharge=1,510 ft³/s, gage height=7.43 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
2–22–72	0100	3.19	53	2–22–72	1300	3.42	77
	0200	3.20	54		1400	3.45	81
	0300	3.21	55		1500	3.48	85
	0400	3.23	57		1600	3.51	88
	0500	3.26	60		1700	3.53	91
	0600	3.29	63		1800	3.55	93
	0700	3.32	66		1900	3.57	96
	0800	3.35	69		2000	3.59	99
	0900	3.37	72		2100	3.61	101
	1000	3.38	73		2200	3.62	103
	1100	3.39	74		2300	3.63	104
	1200	3.40	75		2400	3.64	106

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

February 22–29, 1972—Continued

(Maximum discharge=1,510 ft³/s; gage height=7.43 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
2–23–72	0100	3.64	106	2–25–72	0100	6.77	1,130
	0200	3.63	104		0200	6.62	1,050
	0300	3.63	104		0300	6.44	960
	0400	3.63	104		0400	6.27	875
	0500	3.63	104		0500	6.10	790
	0600	3.63	104		0600	5.95	730
	0700	3.63	104		0700	5.79	666
	0800	3.63	104		0800	5.69	626
	0900	3.63	104		0900	5.59	586
	1000	3.62	103		1000	5.48	548
	1100	3.62	103		1100	5.38	514
	1200	3.62	103		1200	5.29	487
	1300	3.62	103		1300	5.20	460
	1400	3.64	106		1400	5.11	433
	1500	3.67	110		1500	5.03	409
	1600	3.71	116		1600	4.96	390
	1700	3.74	120		1700	4.92	380
	1800	3.75	122		1800	4.87	367
	1900	3.72	117		1900	4.82	355
	2000	3.72	117		2000	4.77	342
	2100	3.70	114		2100	4.73	332
	2200	3.69	113		2200	4.71	327
	2300	3.69	113		2300	4.66	315
	2400	3.68	111		2400	4.66	315
2–24–72	0100	3.68	111	2–26–72	0100	4.68	320
	0200	3.68	111		0200	4.73	332
	0300	3.68	111		0300	4.83	357
	0400	3.72	117		0400	5.00	400
	0500	3.86	140		0500	5.24	472
	0600	4.22	209		0600	5.51	558
	0700	4.82	355		0700	5.74	646
	0800	5.52	562		0800	5.88	702
	0900	6.23	855		0900	6.01	754
	1000	6.84	1,160		1000	6.11	795
	1100	7.25	1,400		1100	6.14	810
	1200	7.43	1,510		1200	6.11	795
	1300	7.21	1,380		1300	6.05	770
	1400	7.01	1,260		1400	5.99	746
	1500	6.82	1,150		1500	5.92	718
	1600	6.66	1,070		1600	5.84	686
	1700	6.56	1,020		1700	5.74	646
	1800	6.49	985		1800	5.65	610
	1900	6.49	985		1900	5.57	579
	2000	6.59	1,040		2000	5.48	548
	2100	6.79	1,140		2100	5.40	520
	2200	6.97	1,230		2200	5.31	493
	2300	7.02	1,260		2300	5.24	472
	2400	6.95	1,220		2400	5.16	448

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

February 22–29, 1972—Continued

(Maximum discharge=1,510 ft^3/s, gage height=7.43 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–27–72	0100	5.09	427
	0200	5.02	406
	0300	4.96	390
	0400	4.90	375
	0500	4.85	362
	0600	4.79	347
	0700	4.75	337
	0800	4.70	325
	0900	4.65	312
	1000	4.62	305
	1100	4.58	295
	1200	4.54	285
	1300	4.51	277
	1400	4.47	267
	1500	4.44	260
	1600	4.40	250
	1700	4.37	242
	1800	4.34	235
	1900	4.32	230
	2000	4.30	225
	2100	4.27	219
	2200	4.24	213
	2300	4.21	207
	2400	4.18	201
2–28–72	0100	4.15	195
	0200	4.12	189
	0300	4.10	185
	0400	4.07	179
	0500	4.04	173
	0600	4.01	167
	0700	3.99	163
	0800	3.96	158
	0900	3.93	152
	1000	3.91	149
	1100	3.88	144
	1200	3.86	140
2–28–72	1300	3.84	137
	1400	3.83	135
	1500	3.82	133
	1600	3.80	130
	1700	3.78	127
	1800	3.75	122
	1900	3.74	120
	2000	3.73	119
	2100	3.71	116
	2200	3.70	114
	2300	3.68	111
	2400	3.66	108
2–29–72	0100	3.65	107
	0200	3.63	104
	0300	3.62	103
	0400	3.60	100
	0500	3.59	99
	0600	3.58	97
	0700	3.56	95
	0800	3.55	93
	0900	3.54	92
	1000	3.53	91
	1100	3.51	88
	1200	3.50	87
	1300	3.49	86
	1400	3.47	83
	1500	3.46	82
	1600	3.45	81
	1700	3.44	80
	1800	3.43	79
	1900	3.42	77
	2000	3.41	76
	2100	3.41	76
	2200	3.40	75
	2300	3.39	74
	2400	3.38	73

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

January 9–15, 1974

(Maximum discharge=1,790 ft^3/s; gage height=7.80 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
1– 9–74	0100	2.99	47	1–11–74	0100	5.74	646
	0200	3.00	48		0200	5.80	670
	0300	3.00	48		0300	5.87	698
	0400	3.02	50		0400	6.01	754
	0500	3.04	51		0500	6.38	930
	0600	3.09	55		0600	6.74	1,110
	0700	3.15	60		0700	7.33	1,450
	0800	3.24	69		0800	7.80	1,790
	0900	3.35	79		0900	7.64	1,660
	1000	3.42	86		1000	7.62	1,650
	1100	3.49	93		1100	7.52	1,570
	1200	3.55	99		1200	7.33	1,450
	1300	3.61	105		1300	7.22	1,380
	1400	3.68	114		1400	7.07	1,290
	1500	3.75	123		1500	6.89	1,190
	1600	3.82	133		1600	6.68	1,080
	1700	3.88	144		1700	6.48	980
	1800	3.92	151		1800	6.30	890
	1900	3.95	156		1900	6.15	815
	2000	3.98	161		2000	6.01	754
	2100	4.00	165		2100	5.88	702
	2200	4.01	167		2200	5.74	646
	2300	4.01	167		2300	5.61	594
	2400	4.01	167		2400	5.49	551
1–10–74	0100	4.01	167	1–12–74	0100	5.41	523
	0200	4.01	167		0200	5.32	496
	0300	4.01	167		0300	5.23	469
	0400	4.00	165		0400	5.14	442
	0500	4.00	165		0500	5.07	421
	0600	4.00	165		0600	5.00	400
	0700	4.05	175		0700	4.92	380
	0800	4.10	185		0800	4.85	362
	0900	4.24	213		0900	4.79	347
	1000	4.27	219		1000	4.72	330
	1100	4.29	223		1100	4.67	317
	1200	4.33	232		1200	4.61	302
	1300	4.41	252		1300	4.56	290
	1400	4.49	272		1400	4.52	280
	1500	4.58	295		1500	4.47	267
	1600	4.67	317		1600	4.43	257
	1700	4.75	337		1700	4.38	245
	1800	4.89	372		1800	4.34	235
	1900	5.00	400		1900	4.30	225
	2000	5.14	442		2000	4.26	217
	2100	5.26	478		2100	4.22	209
	2200	5.38	514		2200	4.18	201
	2300	5.53	565		2300	4.14	193
	2400	5.64	606		2400	4.11	187

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

January 9–15, 1974—Continued

(Maximum discharge=1,790 ft³/s, gage height=7.80 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–13–74	0100	4.07	179	1–14–74	1300	3.41	85
	0200	4.04	173		1400	3.40	84
	0300	4.00	165		1500	3.41	85
	0400	3.97	160		1600	3.40	84
	0500	3.94	154		1700	3.39	83
	0600	3.92	151		1800	3.38	82
	0700	3.90	147		1900	3.37	81
	0800	3.87	142		2000	3.36	80
	0900	3.85	138		2100	3.35	79
	1000	3.82	133		2200	3.34	78
	1100	3.80	130		2300	3.33	77
	1200	3.78	127		2400	3.32	76
	1300	3.76	124				
	1400	3.73	120	1–15–74	0100	3.31	75
	1500	3.72	119		0200	3.30	74
	1600	3.70	116		0300	3.29	73
	1700	3.68	114		0400	3.28	72
	1800	3.67	112		0500	3.27	71
	1900	3.65	110		0600	3.26	70
	2000	3.64	109		0700	3.25	69
	2100	3.62	106		0800	3.25	69
	2200	3.61	105		0900	3.24	69
	2300	3.59	103		1000	3.23	68
	2400	3.58	102		1100	3.21	66
					1200	3.19	64
1–14–74	0100	3.56	100		1300	3.17	62
	0200	3.55	99		1400	3.17	62
	0300	3.53	97		1500	3.16	61
	0400	3.52	96		1600	3.15	60
	0500	3.51	95		1700	3.14	60
	0600	3.49	93		1800	3.13	59
	0700	3.48	92		1900	3.13	59
	0800	3.47	91		2000	3.15	60
	0900	3.46	90		2100	3.15	60
	1000	3.44	88		2200	3.13	59
	1100	3.43	87		2300	3.11	57
	1200	3.42	86		2400	3.09	55

Table B-7.—*Hourly gage height and discharge for selected days at gaging station 03213500 Panther Creek near Panther, West Virginia*—Continued

April 2–5, 1977

(Maximum discharge=6,600 ft^3/s, gage height=12.10 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
4– 2–77	1800	2.74	22
	1900	2.74	22
	2000	2.74	22
	2100	2.75	22
	2200	2.78	23
	2300	2.81	25
	2400	2.84	26
4– 3–77	0100	2.87	28
	0200	2.92	32
	0300	3.06	43
	0400	3.29	61
	0500	3.39	71
	0600	3.45	78
	0700	3.49	83
	0800	3.52	86
	0900	3.55	90
	1000	3.58	94
	1100	3.60	96
	1200	3.64	102
	1300	3.66	104
	1400	3.68	107
	1500	3.70	110
	1600	3.73	114
	1700	3.72	113
	1800	3.73	114
	1900	3.73	114
	2000	3.74	116
	2100	3.74	116
	2200	3.74	116
	2300	3.75	117
	2400	3.79	123
4– 4–77	0100	3.91	171
	0200	4.05	192
	0300	4.28	236
	0400	4.68	325
	0500	5.51	583
	0600	6.30	890
	0700	7.05	1,280
	0800	7.61	1,640
4– 4–77	0900	8.24	2,140
	1000	8.34	2,220
	1100	8.53	2,370
	1200	8.59	2,420
	1300	8.77	2,570
	1400	9.14	2,890
	1500	9.85	3,600
	1600	11.14	5,160
	[a]1700	12.10	6,600
	1800	10.70	4,590
	1900	10.30	4,110
	2000	9.70	3,450
	2100	9.20	2,950
	2200	8.80	2,590
	2300	8.30	2,190
	2400	8.00	1,950
4– 5–77	0100	7.60	1,630
	0200	7.30	1,430
	0300	7.10	1,310
	0400	6.80	1,140
	0500	6.60	1,040
	0600	6.40	940
	0700	6.20	840
	0800	6.10	800
	0900	5.90	720
	1000	5.75	667
	1100	5.60	615
	1200	5.50	580
	1300	5.40	545
	1400	5.30	510
	1500	5.20	480
	1600	5.10	450
	1700	5.05	435
	1800	5.00	420
	1900	4.95	405
	2000	4.90	390
	2100	4.85	375
	2200	4.80	360
	2300	4.75	345
	2400	4.70	330

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[a] Gage height and discharge estimated from 1700 April 4 through April 5.

Table B-8.—*Hourly gage height and discharge for selected days at gaging station 03213700 Tug Fork at Williamson, West Virginia*

February 24–28, 1972

(Maximum discharge=20,600 ft^3/s, gage height=29.75 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–24–72	0100	8.59	3,030
	0200	8.71	3,110
	0300	8.98	3,270
	0400	9.34	3,480
	0500	9.67	3,680
	0600	10.02	3,890
	0700	10.78	4,350
	0800	11.85	4,990
	0900	13.02	5,720
	1000	14.38	6,720
	1100	15.87	7,800
	1200	17.33	8,960
	1300	18.78	10,200
	1400	20.14	11,400
	1500	21.53	12,700
	1600	22.92	13,900
	1700	24.02	14,900
	1800	24.82	15,700
	1900	25.14	16,000
	2000	25.26	16,200
	2100	25.38	16,300
	2200	25.32	16,200
	2300	25.03	15,900
	2400	24.79	15,700
2–25–72	0100	24.58	15,500
	0200	24.41	15,300
	0300	23.92	14,800
	0400	23.59	14,500
	0500	23.37	14,300
	0600	23.19	14,200
	0700	23.03	14,000
	0800	22.94	13,900
	0900	23.05	14,000
	1000	24.35	15,300
	1100	25.75	16,700
	1200	26.99	17,900
	1300	28.00	18,900
	1400	28.99	19,900
	1500	29.67	20,600
	1600	29.75	20,700
	1700	29.10	20,000
	1800	28.20	19,100
	1900	27.02	17,900
	2000	25.86	16,800
	2100	25.00	15,900
	2200	24.33	15,200
	2300	23.78	14,700
	2400	23.35	14,300
2–26–72	0100	23.11	14,100
	0200	23.01	14,000
	0300	22.95	14,000
	0400	22.98	14,000
	0500	23.13	14,100
	0600	23.25	14,200
	0700	23.42	14,400
	0800	23.38	14,300
	0900	23.11	14,100
	1000	22.78	13,800
	1100	22.50	13,600
	1200	22.13	13,200
	1300	21.80	12,900
	1400	21.43	12,600
	1500	21.37	12,500
	1600	21.18	12,400
	1700	20.88	12,100
	1800	20.70	11,900
	1900	20.59	11,800
	2000	20.48	11,700
	2100	20.42	11,700
	2200	20.35	11,600
	2300	20.29	11,600
	2400	20.21	11,500
2–27–72	0100	20.00	11,300
	0200	19.74	11,100
	0300	19.53	10,900
	0400	19.32	10,700
	0500	19.22	10,600
	0600	19.17	10,600
	0700	19.07	10,500
	0800	19.05	10,400
	0900	19.35	10,700
	1000	20.00	11,300
	1100	20.95	12,200
	1200	22.55	13,600
	1300	22.70	13.700
	1400	22.05	13,100
	1500	21.35	12,500
	1600	20.60	11,800
	1700	20.00	11,300
	1800	19.40	10,800
	1900	18.85	10,300
	2000	18.35	9,810
	2100	17.90	9,420
	2200	17.50	9,100
	2300	17.10	8,780
	2400	16.75	8,500

Table B-8.—*Hourly gage height and discharge for selected days at gaging station 03213700 Tug Fork at Williamson, West Virginia*—Continued

February 24–28, 1972—Continued

(Maximum discharge=20,600 ft^3/s, gage height=29.75 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–28–72	0100	16.35	8,180
	0200	16.10	7,980
	0300	15.80	7,750
	0400	15.50	7,530
	0500	15.20	7,310
	0600	14.95	7,130
	0700	14.65	6,910
	0800	14.40	6,730
	0900	14.20	6,580
	1000	13.95	6,400
	1100	13.75	6,250
	1200	13.60	6,140
2–28–72	1300	13.45	6,040
	1400	13.25	5,890
	1500	13.10	5,780
	1600	12.95	5,670
	1700	12.75	5,530
	1800	12.60	5,440
	1900	12.45	5,350
	2000	12.33	5,280
	2100	12.15	5,170
	2200	12.05	5,110
	2300	11.90	5,020
	2400	11.83	4,980

January 9–15, 1974

(Maximum discharge=29,200 ft^3/s, gage height=37.37 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
1–09–74	0400	7.34	2,050
	0500	7.38	2,080
	0600	7.40	2,090
	0700	7.44	2,110
	0800	7.48	2,140
	0900	7.52	2,160
	1000	7.60	2,210
	1100	7.67	2,250
	1200	7.75	2,300
	1300	7.82	2,340
	1400	7.92	2,400
	1500	8.06	2,490
	1600	8.22	2,580
	1700	8.42	2,700
	1800	8.62	2,820
	1900	8.82	2,940
	2000	9.02	3,060
	2100	9.20	3,170
	2200	9.40	3,290
	2300	9.55	3,380
	2400	9.75	3,500
[a]1–10–74	0100	10.00	3,650
	0200	10.25	3,800
[a]1–10–74	0300	10.50	3,950
	0400	10.70	4,090
	0500	10.90	4,230
	0600	11.10	4,370
	0700	11.40	4,580
	0800	11.70	4,790
	0900	12.00	5,000
	1000	12.40	5,280
	1100	12.80	5,560
	1200	13.20	5,840
	1300	13.50	6,050
	1400	14.00	6,400
	1500	14.50	6,750
	1600	15.00	7,100
	1700	15.50	7,500
	1800	16.00	7,900
	1900	16.50	8,300
	2000	17.10	8,780
	2100	17.70	9,260
	2200	18.50	9,950
	2300	19.20	10,600
	2400	19.90	11,200

[a] Gage height and discharge estimated January 10 through 1000 January 11.

Table B-8.—*Hourly gage height and discharge for selected days at gaging station 03213700 Tug Fork at Williamson, West Virginia*—Continued

January 9–15, 1974—Continued

(Maximum discharge=29,200 ft³/s, gage height=37.37 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–11–74	0100	20.60	11,800
	0200	21.50	12,700
	0300	22.40	13,500
	0400	23.30	14,300
	0500	24.20	15,100
	0600	25.40	16,300
	0700	26.50	17,400
	0800	27.50	18,400
	0900	28.50	19,400
	1000	29.40	20,300
	1100	30.48	21,400
	1200	31.02	22,000
	1300	31.61	22,700
	1400	32.27	23,400
	1500	33.03	24,200
	1600	33.82	25,100
	1700	34.54	25,900
	1800	35.21	26,600
	1900	35.77	27,200
	2000	36.27	27,800
	2100	36.66	28,300
	2200	36.94	28,600
	2300	37.15	28,900
	2400	37.29	29,100
1–12–74	0100	37.37	29,200
	0200	37.23	29,000
	0300	37.03	28,700
	0400	36.70	28,300
	0500	36.20	27,700
	0600	35.56	27,000
	0700	34.88	26,300
	0800	34.14	25,500
	0900	33.38	24,600
	1000	32.49	23,600
	1100	31.65	22,700
	1200	30.63	21,600
1–12–74	1300	29.68	20,600
	1400	28.57	19,500
	1500	27.47	18,400
	1600	26.44	17,300
	1700	25.29	16,200
	1800	24.28	15,200
	1900	23.41	14,400
	2000	22.52	13,600
	2100	21.67	12,800
	2200	20.83	12,000
	2300	20.00	11,300
	2400	19.25	10,600
1–13–74	0100	18.52	9,970
	0200	17.91	9,430
	0300	17.34	8,970
	0400	16.82	8,560
	0500	16.41	8,230
	0600	16.02	7,920
	0700	15.64	7,610
	0800	15.29	7,330
	0900	14.95	7,060
	1000	14.67	6,870
	1100	14.42	6,690
	1200	14.18	6,530
	1300	13.92	6,340
	1400	13.67	6,170
	1500	13.46	6,020
	1600	13.23	5,860
	1700	13.03	5,720
	1800	12.85	5,590
	1900	12.66	5,460
	2000	12.51	5,360
	2100	12.46	5,320
	2200	12.23	5,160
	2300	12.12	5,080
	2400	11.96	4,970

Table B-8.—*Hourly gage height and discharge for selected days at gaging station 03213700 Tug Fork at Williamson, West Virginia*—Continued

January 9–15, 1974—Continued

(Maximum discharge=29,200 ft³/s, gage height=37.37 ft)—Contined

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–14–74	0100	11.86	4,900	1–15–74	0100	9.66	3,450
	0200	11.67	4,770		0200	9.61	3,420
	0300	11.56	4,690		0300	9.53	3,370
	0400	11.44	4,610		0400	9.48	3,340
	0500	11.34	4,540		0500	9.40	3,290
	0600	11.23	4,460		0600	9.29	3,220
	0700	11.10	4,370		0700	9.21	3,180
	0800	11.02	4,310		0800	9.17	3,150
	0900	10.91	4,240		0900	9.10	3,110
	1000	10.82	4,170		1000	9.04	3,070
	1100	10.72	4,100		1100	8.99	3,040
	1200	10.60	4,020		1200	8.94	3,010
	1300	10.55	3,990		1300	8.92	3,000
	1400	10.50	3,950		1400	8.87	2,970
	1500	10.40	3,890		1500	8.84	2,950
	1600	10.34	3,850		1600	8.82	2,940
	1700	10.24	3,790		1700	8.78	2,920
	1800	10.15	3,740		1800	8.72	2,880
	1900	10.11	3,720		1900	8.68	2,860
	2000	10.02	3,660		2000	8.63	2,830
	2100	9.93	3,610		2100	8.61	2,820
	2200	9.84	3,550		2200	8.58	2,800
	2300	9.78	3,520		2300	8.53	2,770
	2400	9.74	3,490		2400	8.48	2,740

April 4–7, 1977

(Maximum discharge=94,000 ft³/s, gage height=52.56 ft)

Gage malfunction – no gage-height record for this flow event.

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*

February 27–March 4, 1955

(Maximum discharge=44,600 ft^3/s, gage height=40.60 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–27–55	0100	8.19	2,910	3– 1–55	0100	40.53	44,400
	0200	8.29	2,970		0200	40.46	44,100
	0300	8.43	3,040		0300	40.37	43,800
	0400	8.61	3,130		0400	40.29	43,500
	0500	8.82	3,240		0500	40.24	43,300
	0600	9.11	3,390		0600	40.17	43,100
	0700	9.56	3,620		0700	40.13	43,000
	0800	10.27	4,010		0800	40.06	42,700
	0900	11.29	4,640		0900	40.03	42,600
	1000	12.74	5,580		1000	39.99	42,500
	1100	17.24	9,170		1100	39.94	42,300
	1200	19.06	10,800		1200	39.89	42,200
	1300	21.02	12,600		1300	39.81	42,000
	1400	22.78	14,400		1400	39.73	41,800
	1500	24.36	16,100		1500	39.68	41,600
	1600	25.84	17,800		1600	39.41	40,900
	1700	27.07	19,300		1700	39.17	40,200
	1800	28.04	20,600		1800	38.89	39,400
	1900	28.96	21,800		1900	38.62	38,700
	2000	29.62	22,700		2000	38.27	37,700
	2100	30.28	23,600		2100	37.87	36,700
	2200	30.73	24,200		2200	37.54	36,000
	2300	31.17	24,900		2300	37.07	34,900
	2400	31.65	25,600		2400	36.71	34,100
2–28–55	0100	32.00	26,100	3– 2–55	0100	36.37	33,300
	0200	32.45	26,700		0200	36.02	32,500
	0300	32.84	27,300		0300	35.64	31,900
	0400	33.14	27,700		0400	35.33	31,400
	0500	33.51	28,400		0500	35.10	31,000
	0600	34.01	29,200		0600	34.64	30,200
	0700	34.39	29,800		0700	34.39	29,800
	0800	34.76	30,400		0800	34.19	29,500
	0900	35.34	31,400		0900	33.73	28,700
	1000	35.79	32,200		1000	33.49	28,300
	1100	36.34	33,300		1100	33.21	27,900
	1200	36.96	34,700		1200	32.78	27,200
	1300	37.48	35,800		1300	32.33	26,500
	1400	37.94	36,900		1400	31.92	26,000
	1500	38.51	38,400		1500	31.44	25,300
	1600	39.01	39,800		1600	30.92	24,500
	1700	39.42	40,900		1700	30.39	23,800
	1800	39.73	41,800		1800	29.81	22,900
	1900	40.16	43,100		1900	29.19	22,100
	2000	40.37	43,800		2000	28.57	21,300
	2100	40.49	44,200		2100	27.92	20,400
	2200	40.57	44,500		2200	27.13	19,400
	2300	40.60	44,600		2300	26.45	18,600
	2400	40.58	44,500		2400	25.75	17,700

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

February 27–March 4, 1955 —Continued

(Maximum discharge=44,600 ft^3/s, gage height=40.60 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
[a]3– 3–55	0100	25.06	16,900	[a]3– 4–55	0100	13.90	6,420
	0200	24.33	16,100		0200	13.80	6,350
	0300	23.61	15,300		0300	13.70	6,270
	0400	22.96	14,600		0400	13.60	6,200
	0500	22.27	13,900		0500	13.50	6,130
	0600	21.62	13,200		0600	13.40	6,050
	0700	21.00	12,600		0700	13.30	5,970
	0800	20.42	12,100		0800	13.20	5,900
	0900	19.83	11,500		0900	13.15	5,860
	1000	19.31	11,000		1000	13.10	5,820
	1100	18.78	10,500		1100	13.05	5,790
	1200	18.26	10,000		1200	13.00	5,750
	1300	17.81	9,640		1300	12.95	5,720
	1400	17.36	9,270		1400	12.90	5,680
	1500	16.94	8,920		1500	12.85	5,650
	1600	16.54	8,580		1600	12.80	5,620
	1700	16.20	8,300		1700	12.75	5,590
	1800	15.80	7,970		1800	12.70	5,550
	1900	15.40	7,630		1900	12.65	5,520
	2000	15.00	7,300		2000	12.65	5,520
	2100	14.65	7,020		2100	12.60	5,490
	2200	14.40	6,820		2200	12.60	5,490
	2300	14.20	6,660		2300	12.55	5,460
	2400	14.05	6,540		2400	12.55	5,460

[a] Gage height and discharge estimated 1700 March 3 through March 4.

January 28–February 1, 1957

(Maximum discharge=61,300 ft^3/s, gage height=43.88 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
1–28–57	0100	6.42	2,010	1–28–57	1700	10.94	4,410
	0200	6.43	2,020		1800	11.80	4,970
	0300	6.45	2,030		1900	12.72	5,570
	0400	6.48	2,040		2000	13.72	6,290
	0500	6.55	2,080		2100	14.69	7,050
	0600	6.63	2,120		2200	15.77	7,940
	0700	6.72	2,160		2300	17.39	9,290
	0800	6.86	2,230		2400	18.25	10,000
	0900	7.03	2,320				
	1000	7.27	2,440	1–29–57	0100	19.13	10,900
	1100	7.55	2,580		0200	19.90	11,600
	1200	7.93	2,780		0300	20.65	12,300
	1300	8.35	3,000		0400	21.36	13,000
	1400	8.92	3,290		0500	22.04	13,700
	1500	9.51	3,600		0600	22.65	14,300
	1600	10.23	3,990		0700	23.25	14,900

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

January 28–February 1, 1957—Continued

(Maximum discharge=61,300 ft^3/s, gage height=43.88 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1–29–57	0800	23.92	15,600	1–30–57	1800	42.55	53,300
	0900	24.75	16,600		1900	41.96	49,800
	1000	25.66	17,600		2000	41.58	48,300
	1100	26.74	18,900		2100	41.10	46,400
	1200	27.90	20,400		2200	40.49	44,200
	1300	29.09	22,000		2300	39.75	41,800
	1400	30.37	23,700		2400	39.10	40,000
	1500	31.54	25,400	1–31–57			
	1600	32.96	27,400		0100	38.32	37,900
	1700	34.11	29,400		0200	37.54	36,000
	1800	35.22	31,200		0300	36.75	34,200
	1900	36.31	33,200		0400	35.96	32,400
	2000	37.20	35,200		0500	35.10	31,000
	2100	37.92	36,800		0600	34.30	29,700
	2200	38.62	38,700		0700	33.27	28,000
	2300	39.27	40,500		0800	32.36	25,600
	2400	39.77	41,900		0900	31.50	25,400
					1000	30.62	24,100
1–30–57	0100	40.41	43,900		1100	29.74	22,800
	0200	40.91	45,700		1200	28.87	21,700
	0300	41.30	47,200		1300	27.88	20,400
	0400	41.71	48,800		1400	27.02	19,300
	0500	41.15	50,900		1500	26.18	18,200
	0600	42.60	53,600		1600	25.34	17,200
	0700	43.00	56,000		1700	24.50	16,300
	0800	43.34	58,000		1800	23.70	15,400
	0900	43.55	59,300		1900	22.94	14,600
	1000	43.71	60,300		2000	22.26	13,900
	1100	43.81	60,900		2100	21.64	13,300
	1200	43.87	61,200		2200	21.05	12,700
	1300	43.88	61,300		2300	20.54	12,200
	1400	43.87	61,200		2400	20.11	11,800
	1500	43.78	60,700	2– 1–57	0100	19.60	11,300
	1600	43.65	59,900		0200	19.24	11,000
	1700	43.28	57,700		0300	18.96	10,700

May 4–11, 1958

(Maximum discharge=47,000 ft^3/s, gage height=41.25 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
5– 4–58	1800	13.90	6,420	5– 5–58	0100	14.77	7,120
	1900	13.96	6,470		0200	14.85	7,180
	2000	14.04	6,530		0300	15.04	7,330
	2100	14.18	6,640		0400	15.27	7,520
	2200	14.34	6,770		0500	15.48	7,700
	2300	14.50	6,900		0600	15.72	7,900
	2400	14.66	7,030		0700	15.98	8,120

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

May 4–11, 1958—Continued

(Maximum discharge=47,000 ft³/s, gage height=41.25 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
5– 5–58	0800	16.52	8,570
	0900	16.56	8,600
	1000	16.52	8,570
	1100	16.48	8,530
	1200	16.44	8,500
	1300	16.49	8,540
	1400	16.63	8,660
	1500	16.91	8,890
	1600	17.14	9,080
	1700	17.41	9,310
	1800	17.72	9,570
	1900	18.02	9,820
	2000	18.27	10,100
	2100	18.52	10,300
	2200	18.79	10,500
	2300	19.01	10,700
	2400	19.26	11,000
5– 6–58	0100	19.58	11,300
	0200	19.99	11,700
	0300	20.36	12,000
	0400	20.77	12,400
	0500	21.23	12,800
	0600	21.63	13,300
	0700	22.11	13,700
	0800	22.49	14,100
	0900	22.91	14,600
	1000	23.27	14,900
	1100	23.61	15,300
	1200	23.96	15,700
	1300	24.37	16,100
	1400	24.75	16,600
	1500	25.18	17,100
	1600	25.54	17,500
	1700	26.08	18,100
	1800	26.56	18,700
	1900	27.39	19,700
	2000	28.14	20,700
	2100	29.06	21,900
	2200	30.00	23,200
	2300	31.00	24,600
	2400	32.02	26,100
5– 7–58	0100	32.98	27,500
	0200	34.00	29,200
	0300	35.00	30,800
5– 7–58	0400	36.02	32,500
	0500	37.01	34,800
	0600	37.73	36,400
	0700	38.54	38,500
	0800	39.19	40,300
	0900	39.73	41,800
	1000	40.26	43,400
	1100	40.60	44,600
	1200	40.87	45,500
	1300	41.02	46,100
	1400	41.16	46,600
	1500	41.25	47,000
	1600	41.18	46,700
	1700	41.07	46,300
	1800	40.89	45,600
	1900	40.72	45,000
	2000	40.43	44,000
	2100	40.11	42,900
	2200	39.65	41,500
	2300	39.24	40,400
	2400	39.83	42,000
5– 8–58	0100	38.33	37,900
	0200	37.86	36,700
	0300	37.46	35,800
	0400	36.84	34,400
	0500	36.32	33,200
	0600	35.76	32,100
	0700	35.12	31,000
	0800	34.46	29,900
	0900	33.87	29,000
	1000	33.17	27,800
	1100	32.53	26,800
	1200	31.90	25,900
	1300	31.28	25,000
	1400	30.63	24,100
	1500	29.91	23,100
	1600	29.34	22,300
	1700	28.73	21,500
	1800	28.12	20,700
	1900	27.47	19,800
	2000	26.96	19,200
	2100	26.21	18,300
	2200	25.58	17,500
	2300	24.89	16,700
	2400	24.26	16,000

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

May 4–11, 1958—Continued

(Maximum discharge=47,000 ft^3/s, gage height=41.25 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
5– 9–58	0100	23.64	15,300	5–10–58	0700	13.87	6,400
	0200	23.04	14,700		0800	13.72	6,290
	0300	22.49	14,100		0900	13.58	6,180
	0400	21.95	13,600		1000	13.43	6,070
	0500	21.49	13,100		1100	13.28	5,960
	0600	20.98	12,600		1200	13.14	5,850
	0700	20.55	12,200		1300	12.99	5,740
	0800	20.10	11,800		1400	12.84	5,650
	0900	19.63	11,300		1500	12.69	5,550
	1000	19.21	10,900		1600	12.54	5,450
	1100	18.80	10,500		1700	12.39	5,350
	1200	18.39	10,200		1800	12.25	5,260
	1300	18.01	9,810		1900	12.14	5,190
	1400	17.61	9,470		2000	12.02	5,110
	1500	17.27	9,190		2100	11.90	5,030
	1600	17.03	8,990		2200	11.82	4,980
	1700	16.75	8,760		2300	11.75	4,940
	1800	16.50	8,550		2400	11.70	4,900
	1900	16.23	8,320				
	2000	15.95	8,090	5–11–58	0100	11.63	4,860
	2100	15.73	7,910		0200	11.58	4,830
	2200	15.46	7,680		0300	11.53	4,790
	2300	15.23	7,490		0400	11.49	4,770
	2400	15.02	7,320		0500	11.47	4,760
					0600	11.43	4,730
5–10–58	0100	14.98	7,280		0700	11.37	4,690
	0200	14.76	7,110		0800	11.29	4,640
	0300	14.55	6,940		0900	11.23	4,600
	0400	14.37	6,800		1000	11.20	4,580
	0500	14.19	6,650		1100	11.17	4,560
	0600	14.01	6,510		1200	11.14	4,540

March 11–15, 1963

(Maximum discharge=69,600 ft^3/s, gage height=45.65 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3–11–63	1200	7.37	2,660	3–11–63	1800	8.15	3,050
	1300	7.35	2,650		1900	8.70	3,360
	1400	7.40	2,670		2000	9.50	3,840
	1500	7.45	2,700		2100	10.60	4,590
	1600	7.60	2,770		2200	12.00	5,540
	1700	7.80	2,870		2300	13.77	6,750
					2400	16.00	8,390

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia—Continued*

March 11–15, 1963—Continued

(Maximum discharge=69,600 ft^3/s, gage height=45.65 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
[a]3–12–63	0100	18.85	10,200	[a]3–14–63	0100	30.20	23,100
	0200	22.25	13,000		0200	29.50	22,000
	0300	25.00	16,200		0300	28.75	20,800
	0400	28.15	19,900		0400	28.15	19,900
	0500	30.85	24,100		0500	27.40	19.000
	0600	33.10	27,700		0600	26.75	18,300
	0700	33.45	28,200		0700	26.00	17,400
	0800	37.00	36,100		0800	25.00	16,200
	0900	38.15	39,300		0900	24.50	15,600
	1000	39.20	43,100		1000	23.65	14,600
	1100	40.00	46,100		1100	22.85	13,700
	1200	40.60	48,400		1200	22.00	12,700
	1300	41.20	50,600		1300	21.50	12,300
	1400	41.70	52,500		1400	20.50	11,400
	1500	42.30	54,800		1500	19.60	10,700
	1600	42.73	56,600		1600	18.85	10,200
	1700	43.20	58,600		1700	18.15	9,700
	1800	43.55	60,100		1800	17.50	9,300
	1900	43.90	61,600		1900	16.85	8,910
	2000	44.20	62,900		2000	16.45	8,670
	2100	44.45	64,000		2100	16.35	8,610
	2200	44.75	65,400		2200	16.20	8,520
	2300	45.00	66,500		2300	16.05	8,420
	2400	45.25	67,700		2400	15.00	7,640
3–13–63	0100	45.65	69,600	3–15–63	0100	14.20	7,040
	0200	45.65	69,600		0200	13.90	6,830
	0300	45.55	69,100		0300	13.55	6,600
	0400	45.40	68,400		0400	13.35	6,460
	0500	45.25	67,700		0500	13.10	6.290
	0600	45.10	67,000		0600	12.95	6,190
	0700	45.00	66,500		0700	12.70	6,020
	0800	44.75	65,400		0800	12.50	5,880
	0900	44.40	63,800		0900	12.35	5,780
	1000	44.00	62,000		1000	12.20	5,680
	1100	43.50	59,900		1100	12.00	5,540
	1200	42.50	55,700		1200	11.90	5,470
	1300	39.50	44,300		1300	11.75	5,370
	1400	38.85	41,800		1400	11.60	5,270
	1500	38.00	38,800		1500	11.50	5,200
	1600	37.20	36,600		1600	11.35	5,100
	1700	36.50	34,700		1700	11.25	5,030
	1800	35.80	32,700		1800	11.15	4,970
	1900	35.00	30,600		1900	11.05	4,900
	2000	34.00	29,100		2000	10.95	4,830
	2100	33.40	28,100		2100	10.85	4,760
	2200	32.55	26,800		2200	10.75	4,690
	2300	31.50	25,100		2300	10.65	4,630
	2400	30.90	24,200		2400	10.05	4,220

[a] **Gage height and discharge estimated 1500 March 12 through 1200 March 14.**

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

March 6–10, 1967

(Maximum discharge=59,000 ft^3/s, gage height=43.30 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3– 6–67	0100	7.17	2,730	[a]3– 8–67	0100	43.15	58,300
	0200	7.19	2,740		0200	42.90	57,300
	0300	7.22	2,750		0300	42.60	56,100
	0400	7.28	2,780		0400	42.25	54,600
	0500	7.37	2,830		0500	41.95	53,400
	0600	7.45	2,870		0600	41.49	51,600
	0700	7.55	2,920		0700	41.14	50,200
	0800	7.69	2,990		0800	40.55	47,900
	0900	7.88	3,090		0900	40.03	45,900
	1000	8.12	3,220		1000	39.40	43,600
	1100	8.38	3,370		1100	38.74	41,200
	1200	8.72	3,570		1200	38.09	39,100
	1300	9.12	3,830		1300	37.34	36,800
	1400	9.64	4,170		1400	36.53	34,500
	1500	10.29	4,590		1500	35.73	32,400
	1600	11.18	5,170		1600	34.90	30,400
	1700	12.28	5,880		1700	34.01	28,600
	1800	13.51	6,680		1800	33.13	27,100
	1900	14.83	7,540		1900	32.23	25,700
	2000	16.37	8,630		2000	31.28	24,300
	2100	18.25	9,800		2100	30.35	23,000
	2200	20.18	11,100		2200	29.38	21,600
	2300	22.14	12,800		2300	28.42	20,300
	2400	24.19	15,000		2400	27.45	19,000
[a]3– 7–67	0100	26.24	17,400	3– 9–67	0100	26.50	17,800
	0200	28.17	19,900		0200	25.56	16,600
	0300	30.13	22,700		0300	24.60	15,500
	0400	31.96	25,300		0400	23.66	14,400
	0500	33.63	28,000		0500	22.73	13,400
	0600	35.10	30,900		0600	21.83	12,500
	0700	36.21	33,700		0700	20.96	11,800
	0800	37.31	36,700		0800	20.12	11,100
	0900	38.13	39,200		0900	19.32	10,500
	1000	38.85	41,600		1000	18.57	10,000
	1100	39.47	43,800		1100	17.85	9,540
	1200	39.99	45,800		1200	17.24	9,150
	1300	40.46	47,500		1300	16.63	8,790
	1400	40,87	49,100		1400	16.22	8,530
	1500	41.28	50,700		1500	15.96	8,350
	1600	41.67	52,300		1600	15.44	7,980
	1700	42.00	53,600		1700	14.94	7,610
	1800	42.30	54,800		1800	14.50	7,320
	1900	42.60	56,100		1900	14.12	7,080
	2000	42.85	57,100		2000	13.80	6,870
	2100	43.15	58,300		2100	13.49	6,670
	2200	43.25	58,800		2200	13.22	6,490
	2300	43.30	59,000		2300	12.97	6,330
	2400	43.25	58,800		2400	12.76	6,190

[a] Gage height and discharge estimated 1700 March 7 through 0500 March 8.

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

March 6–10, 1967—Continued

(Maximum discharge=59,000 ft^3/s, gage height=43.30 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
3–10–67	0100	12.57	6,070	3–10–67	1300	10.92	5,000
	0200	12.38	5,950		1400	10.83	4,940
	0300	12.18	5,820		1500	10.73	4,870
	0400	12.03	5,720		1600	10.62	4,800
	0500	11.86	5,610		1700	10.54	4,750
	0600	11.73	5,520		1800	10.46	4,700
	0700	11.60	5,440		1900	10.39	4,650
	0800	11.47	5,360		2000	10.29	4,590
	0900	11.35	5,280		2100	10.22	4,540
	1000	11.21	5,190		2200	10.14	4,490
	1100	11.08	5,100		2300	10.04	4,430
	1200	11.01	5,060		2400	9.97	4,380

February 23–March 1, 1972

(Maximum discharge=46,800 ft^3/s, gage height=40.25 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
2–23–72	0100	7.28	2,630	2–24–72	0100	8.70	3,390
	0200	7.30	2,640		0200	8.73	3,400
	0300	7.35	2,670		0300	8.80	3,440
	0400	7.37	2,680		0400	8.91	3,500
	0500	7.42	2,700		0500	9.08	3,590
	0600	7.45	2,720		0600	9.31	3,720
	0700	7.49	2,740		0700	9.71	3,940
	0800	7.51	2,750		0800	10.38	4,330
	0900	7.57	2,780		0900	11.53	5,040
	1000	7.62	2,800		1000	13.04	6,030
	1100	7.69	2,840		1100	14.66	7,160
	1200	7.73	2,860		1200	16.83	8,680
	1300	7.82	2,900		1300	18.48	9,860
	1400	7.88	2,930		1400	20.04	11,000
	1500	7.95	2,970		1500	21.53	12,300
	1600	8.04	3,020		1600	22.98	13,700
	1700	8.12	3,070		1700	24.19	15,000
	1800	8.19	3,100		1800	25.30	16,300
	1900	8.29	3,160		1900	26.36	17,600
	2000	8.38	3,210		2000	27.26	18,700
	2100	8.47	3,260		2100	28.13	19,900
	2200	8.53	3,290		2200	29.00	21,100
	2300	8.58	3,320		2300	29.84	22,300
	2400	8.64	3,350		2400	30.67	23,400

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

February 23—March 1, 1972—Continued

(Maximum discharge=46,800 ft³/s, gage height=40.25 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
2–25–72	0100	31.48	24,600	2–27–72	0100	39.29	43,200
	0200	32.21	25,700		0200	39.11	42,500
	0300	32.94	26,800		0300	38.91	41,800
	0400	33.63	28,000		0400	38.69	41,100
	0500	34.29	29,200		0500	38.45	40,300
	0600	34.89	30,400		0600	38.21	39,500
	0700	35.40	31,600		0700	37.93	38,600
	0800	35.86	32,800		0800	37.66	37,800
	0900	36.26	33,800		0900	37.30	36,700
	1000	36.55	34,600		1000	37.01	35,800
	1100	36.90	35,500		1100	36.60	34,700
	1200	37.12	36,200		1200	36.18	33,600
	1300	37.34	36,800		1300	35.77	32,500
	1400	37.54	37,400		1400	35.29	31,300
	1500	37.68	37,800		1500	34.80	30,200
	1600	37.83	38,300		1600	34.22	29,000
	1700	37.89	38,500		1700	33.68	28,100
	1800	37.94	38,600		1800	33.10	27,100
	1900	37.99	38,800		1900	32.47	26,100
	2000	37.97	38,700		2000	31.82	25,100
	2100	37.91	38,500		2100	31.14	24,100
	2200	37.82	38,300		2200	30.43	23,100
	2300	37.78	38,100		2300	29.75	22,200
	2400	37.62	37,700		2400	29.02	21,100
2–26–72	0100	37.57	37,500	2–28–72	0100	28.26	20,100
	0200	37.58	37,500		0200	27.55	19,100
	0300	37.64	37,700		0300	26.80	18,100
	0400	37.67	37,800		0400	26.06	17,200
	0500	37.84	38,300		0500	25.30	16,300
	0600	38.00	38,800		0600	24.58	15,400
	0700	38.27	39,700		0700	23.87	14,700
	0800	38.51	40,500		0800	23.13	13,800
	0900	38.79	41,400		0900	22.44	13,100
	1000	39.06	42,300		1000	21.79	12,500
	1100	39.35	43,400		1100	21.12	11,900
	1200	39.65	44,500		1200	20.47	11,400
	1300	39.85	45,200		1300	19.88	10,900
	1400	40.00	45,800		1400	19.28	10,500
	1500	40.11	46,200		1500	18.72	10,000
	1600	40.23	46,700		1600	18.23	9,670
	1700	40.25	46,800		1700	17.75	9,330
	1800	40.21	46,600		1800	17.30	9,010
	1900	40.15	46,400		1900	16.87	8,710
	2000	40.02	45,900		2000	16.46	8,420
	2100	39.96	45,700		2100	16.26	8,280
	2200	39.79	45,000		2200	16.23	8,260
	2300	39.60	44,300		2300	16.14	8,200
	2400	39.50	44,000		2400	15.91	8,040

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

February 23–March 1, 1972—Continued

(Maximum discharge=46,800 ft³/s, gage height=40.25 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
2–29–72	0100	15.65	7,850	3– 1–72	0100	11.58	5,080
	0200	15.38	7,670		0200	11.50	5,030
	0300	15.12	7,480		0300	11.40	4,960
	0400	14.88	7,320		0400	11.31	4,900
	0500	14.62	7,130		0500	11.22	4,840
	0600	14.38	6,970		0600	11.12	4,780
	0700	14.16	6,810		0700	11.04	4,730
	0800	13.94	6,660		0800	10.94	4,660
	0900	13.76	6,530		0900	10.86	4,620
	1000	13.59	6,410		1000	10.79	4,570
	1100	13.42	6,290		1100	10.72	4,530
	1200	13.26	6,180		1200	10.64	4,480
	1300	12.99	5,990		1300	10.56	4,440
	1400	12.87	5,920		1400	10.49	4,390
	1500	12.72	5,820		1500	10.42	4,350
	1600	12.59	5,730		1600	10.35	4,310
	1700	12.46	5,650		1700	10.28	4,270
	1800	12.34	5,570		1800	10.22	4,230
	1900	12.22	5,490		1900	10.14	4,180
	2000	12.10	5,410		2000	10.08	4,150
	2100	11.98	5,340		2100	10.02	4,110
	2200	11.87	5,270		2200	9.96	4,080
	2300	11.76	5,190		2300	9.90	4,050
	2400	11.67	5,140		2400	9.85	4,020

January 9–16, 1974

(Maximum discharge=53,000 ft³/s, gage height=41.85 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft³/s)*
1– 9–74	0100	7.20	2,590	1– 9–74	1800	8.31	3,170
	0200	7.18	2,580		1900	8.44	3,240
	0300	7.16	2,570		2000	8.57	3,310
	0400	7.18	2,580		2100	8.76	3,420
	0500	7.20	2,590		2200	8.92	3,510
	0600	7.24	2,610		2300	9.11	3,610
	0700	7.28	2,630		2400	9.34	3,740
	0800	7.35	2,670				
	0900	7.43	2,710	1–10–74	0100	9.55	3,850
	1000	7.54	2,760		0200	9.70	3,940
	1100	7.64	2,810		0300	9.90	4,050
	1200	7.74	2,860		0400	10.10	4,160
	1300	7.85	2,920		0500	10.25	4,250
	1400	7.95	2,970		0600	10.54	4,420
	1500	8.06	3,030		0700	10.83	4,600
	1600	8.14	3,080		0800	11.37	4,940
	1700	8.23	3,130		0900	12.39	5,600

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

January 9–16, 1974—Continued

(Maximum discharge=53,000 ft³/s, gage height=41.85 ft)—Continued

Date	Time	Gage height (ft)	Discharge (ft³/s)
1–10–74	1000	14.03	6,720
	1100	16.21	8,250
	1200	18.55	9,910
	1300	20.92	11,700
	1400	23.13	13,800
	1500	25.15	16,100
	1600	27.06	18,500
	1700	28.83	20,900
	1800	30.39	23,000
	1900	31.66	24,900
	2000	32.81	26,600
	2100	33.71	28,100
	2200	34.49	29,600
	2300	35.16	31,000
	2400	35.65	32,200
1–11–74	0100	36.10	33,400
	0200	36.50	34,500
	0300	36.89	35,500
	0400	37.22	36,500
	0500	37.50	37,300
	0600	37.82	38,300
	0700	38.04	38,900
	0800	38.31	39,800
	0900	38.61	40,800
	1000	38.83	41,500
	1100	39.14	42,600
	1200	39.42	43,700
	1300	39.71	44,700
	1400	40.01	45,800
	1500	40.27	46,800
	1600	40.50	47,700
	1700	40.77	48,700
	1800	40.98	49,500
	1900	41.18	50,300
	2000	41.39	51,200
	2100	41.48	51,500
	2200	41.61	52,000
	2300	41.78	52,700
	2400	41.85	53,000
[a]1–12–74	0100	41.84	53,000
	0200	41.81	52,800
	0300	41.78	52,700
	0400	41.75	52,600
[a]1–12–74	0500	41.70	52,400
	0600	41.65	52,200
	0700	41.60	52,000
	0800	41.55	51,800
	0900	41.50	51,600
	1000	40.25	46,800
	1100	40.00	45,800
	1200	40.75	48,700
	1300	40.50	47,700
	1400	40.25	46,800
	1500	40.00	45,800
	1600	39.75	44,900
	1700	39.50	44,000
	1800	39.13	42,600
	1900	38.75	41,300
	2000	38.38	40,100
	2100	38.00	38,800
	2200	37.42	37,100
	2300	36.58	34,700
	2400	36.25	33,800
[a]1–13–74	0100	34.88	30,400
	0200	33.50	27,800
	0300	32.13	25,600
	0400	30.75	23,600
	0500	29.38	21,600
	0600	28.00	19,700
	0700	26.26	17,400
	0800	25.25	16,200
	0900	24.50	15,400
	1000	23.75	14,500
	1100	23.25	14,000
	1200	22.75	13,500
	1300	22.25	13,000
	1400	21.75	12,500
	1500	21.25	12,000
	1600	20.75	11,600
	1700	20.25	11,200
	1800	19.88	10,900
	1900	19.50	10,600
	2000	19.13	10,300
	2100	18.75	10,100
	2200	18.38	9,780
	2300	18.00	9,500
	2400	17.63	9,240

[a] Gage height and discharge estimated 0100 January 12 through 1700 January 14.

Table 5-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

January 9–16, 1974—Continued

(Maximum discharge=53,000 ft^3/s, gage height=41.85 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
[a]1–14–74	0100	17.25	8,980	1–15–74	1300	9.83	4,010
	0200	16.92	8,740		1400	9.77	3,970
	0300	16.58	8,510		1500	9.71	3,940
	0400	16.25	8,280		1600	9.61	3,890
	0500	15.92	7,900		1700	9.54	3,850
	0600	15.58	7,810		1800	9.48	3,810
	0700	15.25	7,580		1900	9.42	3,780
	0800	14.94	7,360		2000	9.35	3,740
	0900	14.63	7,140		2100	9.32	3,730
	1000	14.31	6,920		2200	9.25	3,690
	1100	14.00	6,700		2300	9.21	3,670
	1200	13.62	6,430		2400	9.17	3,640
	1300	13.25	6,180				
	1400	12.86	5,910	1–16–74	0100	9.10	3,610
	1500	12.50	5,680		0200	9.03	3,570
	1600	12.13	5,430		0300	8.89	3,540
	1700	11.76	5,190		0400	8.91	3,500
	1800	11.59	5,080		0500	8.85	3,470
	1900	11.44	4,990		0600	8.82	3,450
	2000	11.36	4,930		0700	8.74	3,410
	2100	11.24	4,860		0800	8.68	3,370
	2200	11.12	4,780		0900	8.65	3,360
	2300	11.00	4,700		1000	8.60	3,330
	2400	10.91	4,650		1100	8.55	3,300
					1200	8.49	3,270
1–15–74	0100	10.83	4,600		1300	8.45	3,250
	0200	10.71	4,530		1400	8.39	3,210
	0300	10.63	4,480		1500	8.34	3,190
	0400	10.54	4,420		1600	8.27	3,150
	0500	10.46	4,380		1700	8.21	3,120
	0600	10.37	4,320		1800	8.15	3,080
	0700	10.29	4,270		1900	8.08	3,040
	0800	10.22	4,230		2000	8.03	3,020
	0900	10.12	4,170		2100	7.99	2,990
	1000	10.06	4,140		2200	7.93	2,960
	1100	9.97	4,080		2300	7.91	2,950
	1200	9.89	4,040		2400	7.86	2,920

[a] Gage height and discharge estimated 0100 January 12 through 1700 January 14.

April 3–4, 1977

(Maximum discharge=104,000 ft^3/s, gage height=52.91 ft)

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*	*Date*	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
4– 3–77	0100	3.40	820	4– 3–77	0500	3.46	844
	0200	3.41	824		0600	3.48	852
	0300	3.43	832		0700	3.52	868
	0400	3.45	840		0800	3.54	876

Table B-9.—*Hourly gage height and discharge for selected days at gaging station 03214000 Tug Fork at Kermit, West Virginia*—Continued

January 9–16, 1974—Continued

(Maximum discharge=53,000 ft^3/s, gage height=41.85 ft)—Continued

Date	*Time*	*Gage height (ft)*	*Discharge (ft^3/s)*
4– 3–77	0900	3.56	884
	1000	3.56	884
	1100	3.56	884
	1200	3.57	888
	1300	3.57	888
	1400	3.58	892
	1500	3.58	892
	1600	3.59	896
	1700	3.60	900
	1800	3.62	908
	1900	3.63	912
	2000	3.65	920
	2100	3.67	928
	2200	3.71	944
	2300	3.76	964
	2400	3.82	988
4– 4–77	0100	3.90	1,020
	0200	4.00	1,060
4– 4–77	0300	4.11	1,110
	0400	4.25	1,170
	0500	4.43	1,250
	0600	4.65	1,350
	0700	4.93	1,480
	0800	5.28	1,640
	0900	5.71	1,850
	1000	6.25	2,120
	1100	6.89	2,440
	1200	7.72	2,850
	1300	9.02	3,560
	1400	11.18	4,820
	1500	13.32	6,220
	1600	15.23	7,560
	1700	18.94	10,200
	1800	21.29	12,100
	1900	23.61	14,400
	2000	25.90	17,000
	2100	28.15	19,900
	2200	30.39	23,000

No record through April 6.

Table B-10.—*Coal-hydrology stations located in the Tug Fork basin*

Map index number	*Station number*	*Name*	*Location*		*Drainage area* (mi^2)
			Latitude	*Longitude*	
		WEST VIRGINIA			
1	372012081283839	Tug Fork at Highway 102 Bridge at Blackwolf	37°20'12"	81°28'38"	27.2
2	371937081283639	South Fork at Highway 161 Bridge at Blackwolf	37°19'37"	81°28'36"	17.5
3	[a]03212600	Tug Fork at Welch	37°24'56"	81°35'25"	85.8
4	372512081252939	North Fork Elkhorn Creek at Highway 17 Bridge at North Fork	37°25'12"	81°25'29"	14.4
5	372310081244139	Elkhorn Creek at Highway 17 Bridge at North Fork	37°23'10"	81°24'41"	11.7
6	[a]03212700	Elkhorn Creek at Mritland	37°25'40"	81°33'05"	69.9
7	372702081441439	Clear Fork at U.S. Highway 52 Bridge at Clear Fork Junction	37°27'02"	81°44'14"	25.3
8	[a]03213000	Tug Fork at Litwar	37°29'05"	81°50'40"	502
9	371537081393239	Dry Fork at Highway 9 Bridge at Berwind	37°15'37"	81°39'32"	51.2
10	371643081373839	Jacobs Fork at Highway 16 Bridge at Cucumber	37°16'43"	81°37'38"	31.7
11	371724081390839	Big Creek on Highway 16 near Rift	37°17'24"	81°13'90"	34.0
12	[a]03213800	Dry Fork near Avondale	37°25'32"	81°47'22"	225
13	[a]03213500	Panther Creek near Panther	37°26'45"	81°52'15"	31.0
14	374148082110239	Pigeon Creek at U.S. Highway 52 Bridge at Delbarton	37°41'48"	82°11'02"	23.7
15	374219082100139	Rockhouse Fork at Highway 65/2 Bridge at Delbarton	37°42'19"	82°10'01"	15.6
16	[a]03213800	Pigeon Creek near Lenore	37°47'13"	82°15'44"	93.9
17	374753082171039	Laurel Fork at Highway 65 Bridge at Lenore	37°47'53"	82°17'10"	33.1
18	375132082230239	Marrowbone Creek at Private Bridge at Selwyn	37°51'32"	82°23'02"	20.7
19	[a]03214900	Tug Fork at Glenhayes	37°00'20"	82°30'53"	1,500
20	380602082340239	Mill Creek at U.S. Highway 52 Bridge near Saltpetre	38°06'02"	82°34'02"	20.5
21	381758082323039	Whites Creek at Highway 19 Bridge near Cyprus	38°17'58"	82°32'30"	13.2
		VIRGINIA			
22	03213572	Knox Creek at Hurley	37°25'11"	82°01'10"	27.8
23	03213575	Lester Fork at Hurley	37°25'08"	82°01'18"	12.0
24	03213578	Guess Fork near Hurley	37°26'07"	82°01'54"	13.7
25	03213581	Race Fork near Kelsa	37°26'18"	82°02'45"	7.32
26	03213584	Pawpaw Creek at Kelsa	37°26'07"	82°05'02"	7.49
27	03213587	Left Fork Pawpaw Creek at Kelsa	37°26'02"	82°05'02"	9.16
28	[a]03213590	Knox Creek near Kelsa	37°27'02"	82°03'34"	84.3
		KENTUCKY			
29	03213670	Left Fork Peter Creek at Jamboree	37°29'44"	82°08'14"	(b)
30	03213680	Right Fork Peter Creek near Phelps	37°30'17"	82°09'35"	(b)
31	03213690	Blackberry Creek at Ransom	37°34'06"	82°11'18"	(b)
32	03213698	Pond Creek near Toler	37°38'14"	82°15'13"	(b)
33	03213750	Big Creek at Hatfield	37°43'34"	82°21'06"	(b)
34	03214300	Wolf Creek near McClure	37°45'55"	82°28'55"	(b)

Table B-10.—*Coal-hydrology stations located in the Tug Fork basin*—Continued

Map index number	*Station number*	*Name*	*Location*		*Drainage area* (mi^2)
			Latitude	*Longitude*	
		KENTUCKY—Continued			
35	03214600	Coldwater Fork near Inez	37°50'17"	82°30'53"	(b)
36	03214650	Middle Fork at Inez	37°51'14"	82°32'43"	(b)
37	03214720	Rockhouse Fork near Milo	37°53'06"	82°34'55"	(b)

[a] Continuous-record gaging station.
[b] Not determined.

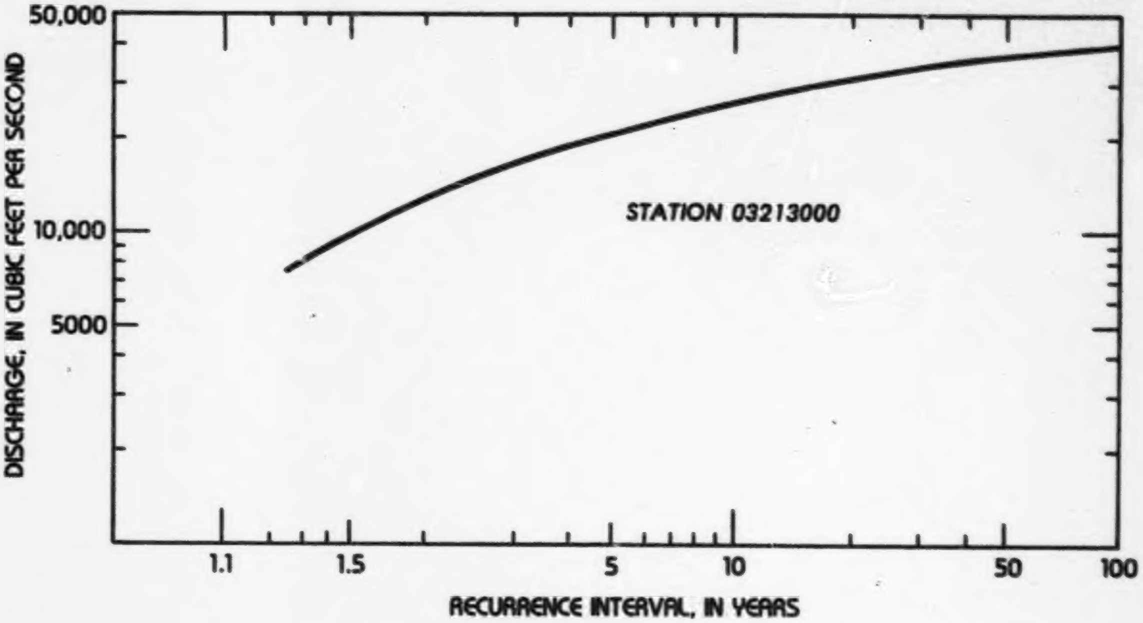


Figure B-1.—Flood-frequency curve for station 03213000 Tug Fork at Litwar, West Virginia.

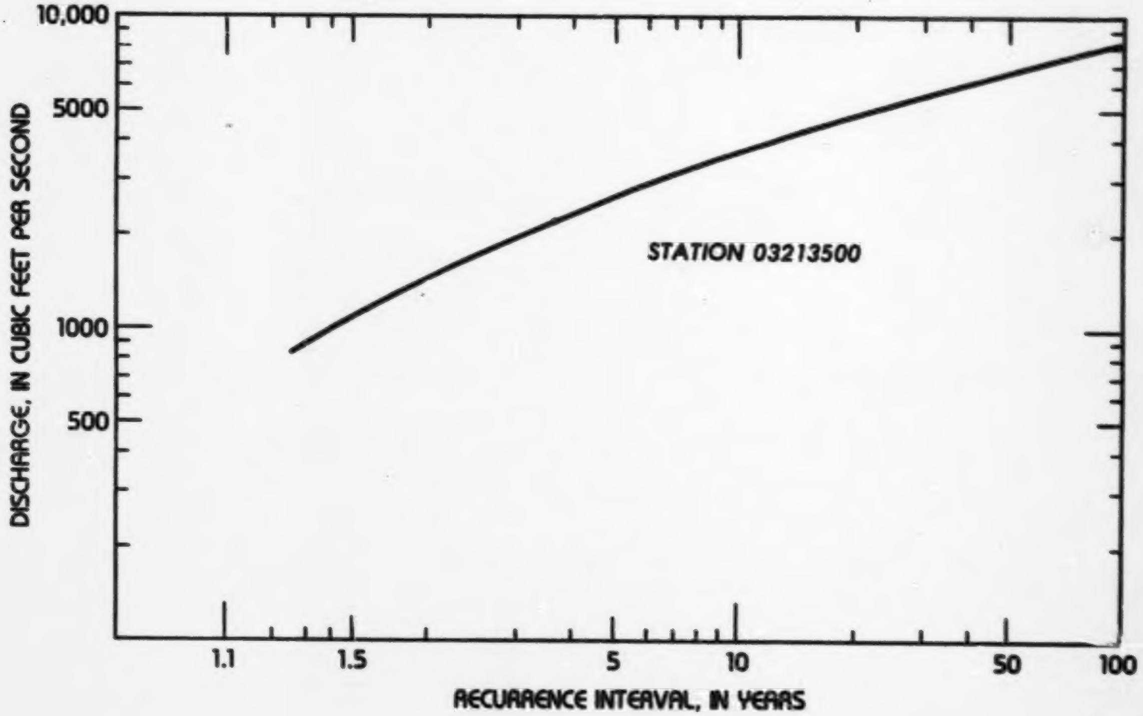


Figure B-2.—Flood-frequency curve for station 03213500 Panther Creek near Panther, West Virginia.

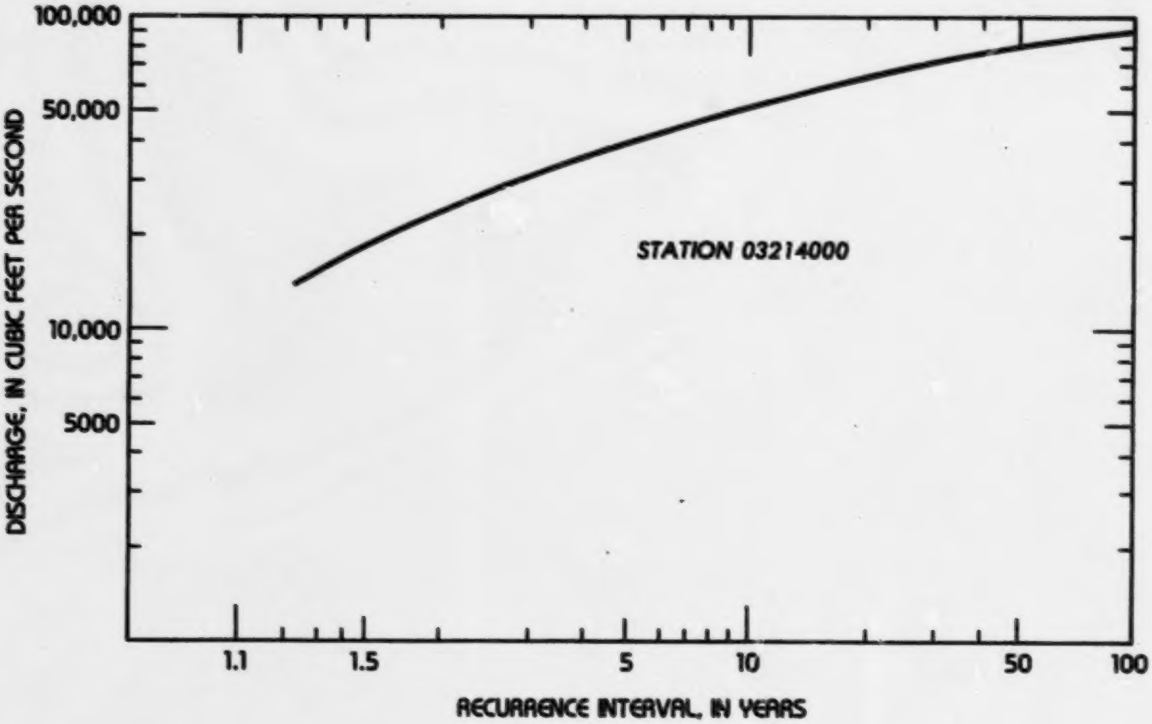
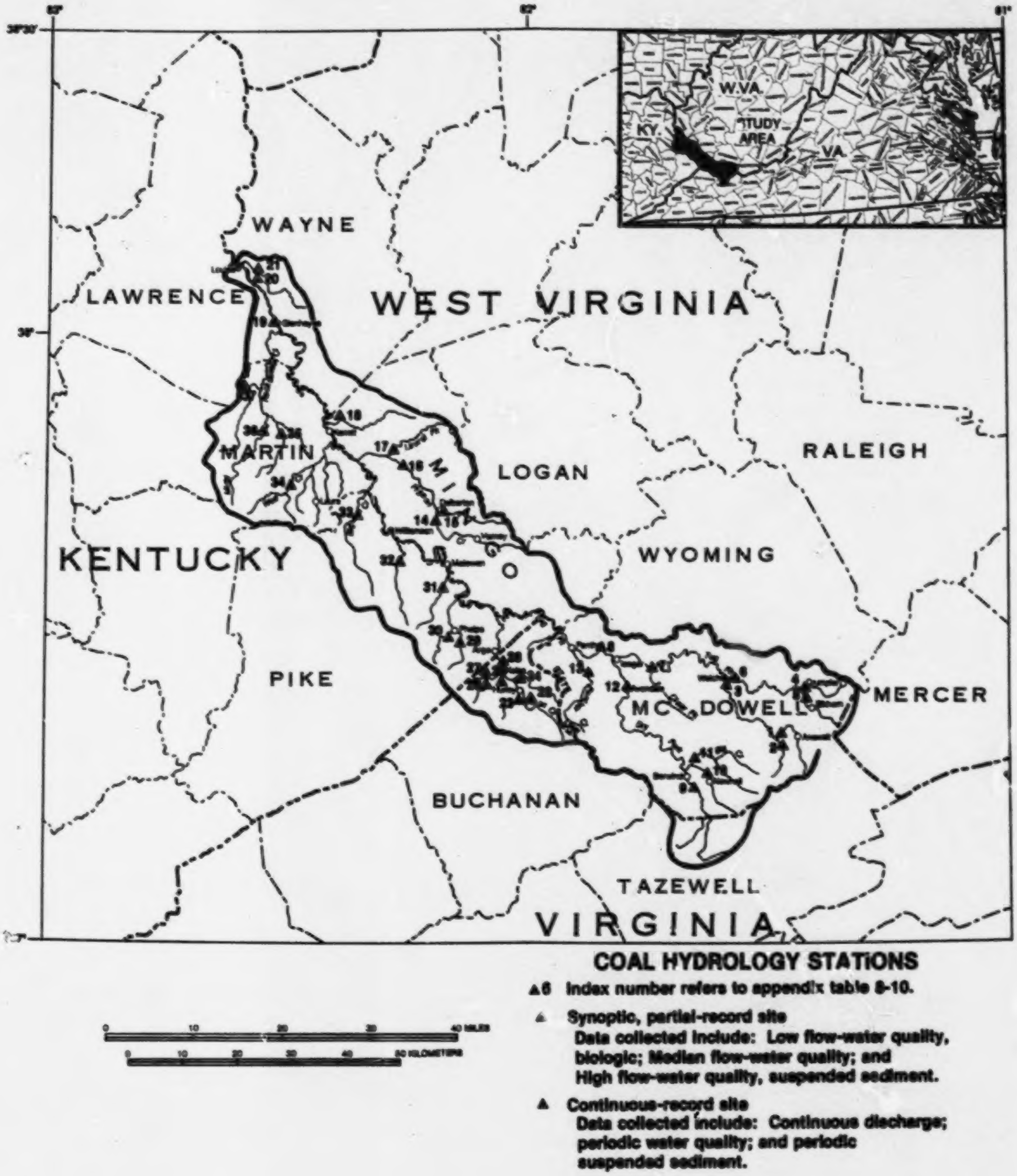


Figure B-3.—Flood-frequency curve for station 03214000 Tug Fork near Kermit, West Virginia.



83°
82°
81°
38°30'
38°
37°
W.VA.
KY.
STUDY AREA
VA.
WAYNE
LAWRENCE
WEST VIRGINIA
MARTIN
MINGO
LOGAN
RALEIGH
KENTUCKY
WYOMING
PIKE
MC DOWELL
MERCER
BUCHANAN
TAZEWELL
VIRGINIA
0 10 20 30 40 MILES
0 10 20 30 40 50 KILOMETERS
COAL HYDROLOGY STATIONS
▲6 Index number refers to appendix table B-10.
▲ Synoptic, partial-record site
Data collected include: Low flow-water quality, biologic; Median flow-water quality; and High flow-water quality, suspended sediment.
▲ Continuous-record site
Data collected include: Continuous discharge; periodic water quality; and periodic suspended sediment.

Figure B-4.—Coal-hydrology stations in Tug Fork basin.

APPENDIX C

APPENDIX C

Land-use Data

Page

Plate C-1. Map showing distribution of land use in the Tug Fork basin during 1973–1976. . . . . In pocket

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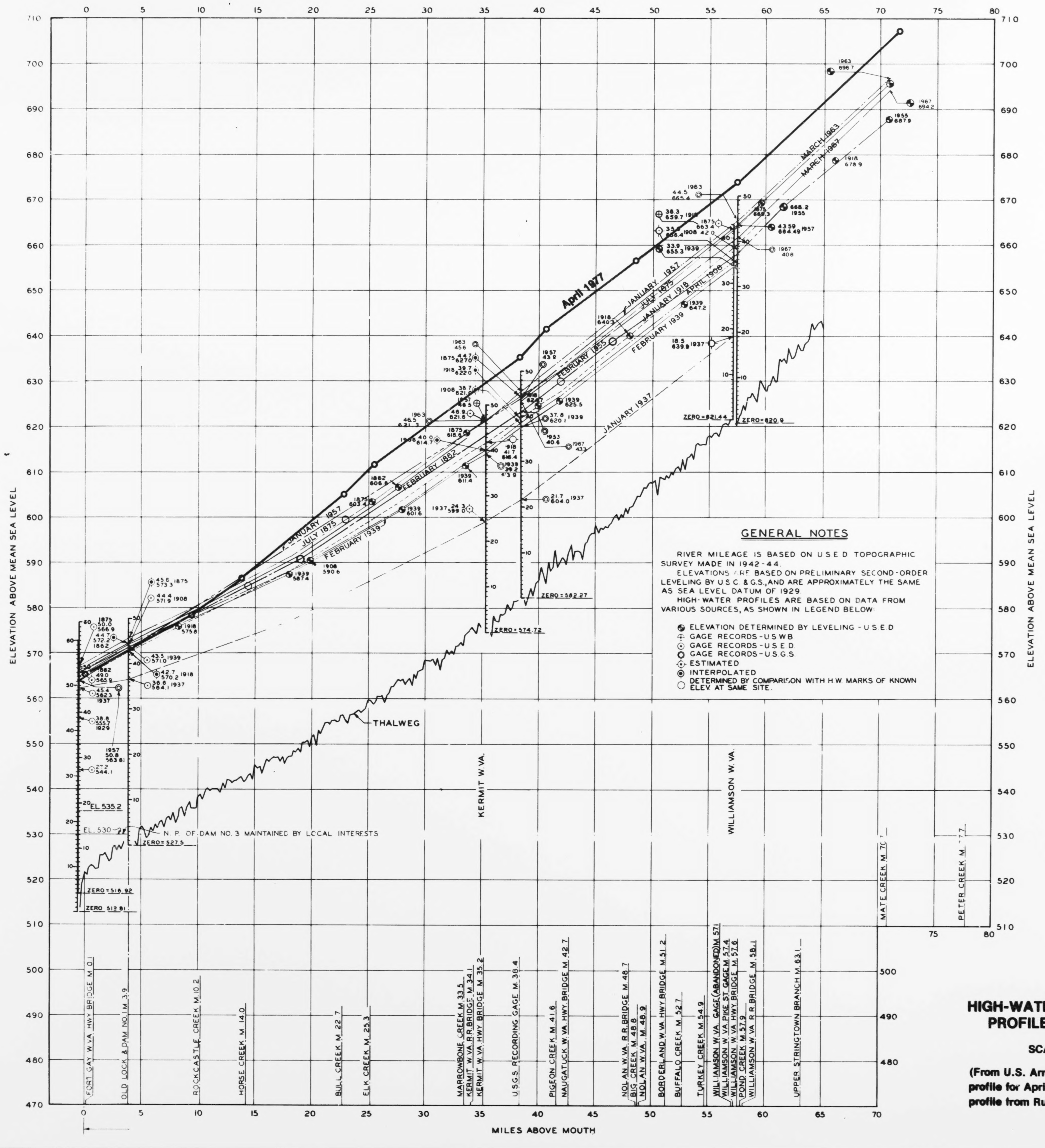


GENERAL NOTES

RIVER MILEAGE IS BASED ON U.S.E.D. TOPOGRAPHIC SURVEY MADE IN 1942-44.

ELEVATIONS ARE BASED ON PRELIMINARY SECOND-ORDER LEVELING BY U.S.C. & G.S., AND ARE APPROXIMATELY THE SAME AS SEA LEVEL DATUM OF 1929.

HIGH-WATER PROFILES ARE BASED ON DATA FROM VARIOUS SOURCES, AS SHOWN IN LEGEND BELOW:

- ● ELEVATION DETERMINED BY LEVELING - U.S.E.D.
- ⊕ GAGE RECORDS - U.S.W.B.
- ⊙ GAGE RECORDS - U.S.E.D.
- O GAGE RECORDS - U.S.G.S.
- ⊙ ESTIMATED
- ◉ INTERPOLATED
- ○ DETERMINED BY COMPARISON WITH H.W. MARKS OF KNOWN ELEV. AT SAME SITE.

HIGH-WATER AND STREAMBED PROFILES FOR TUG FORK

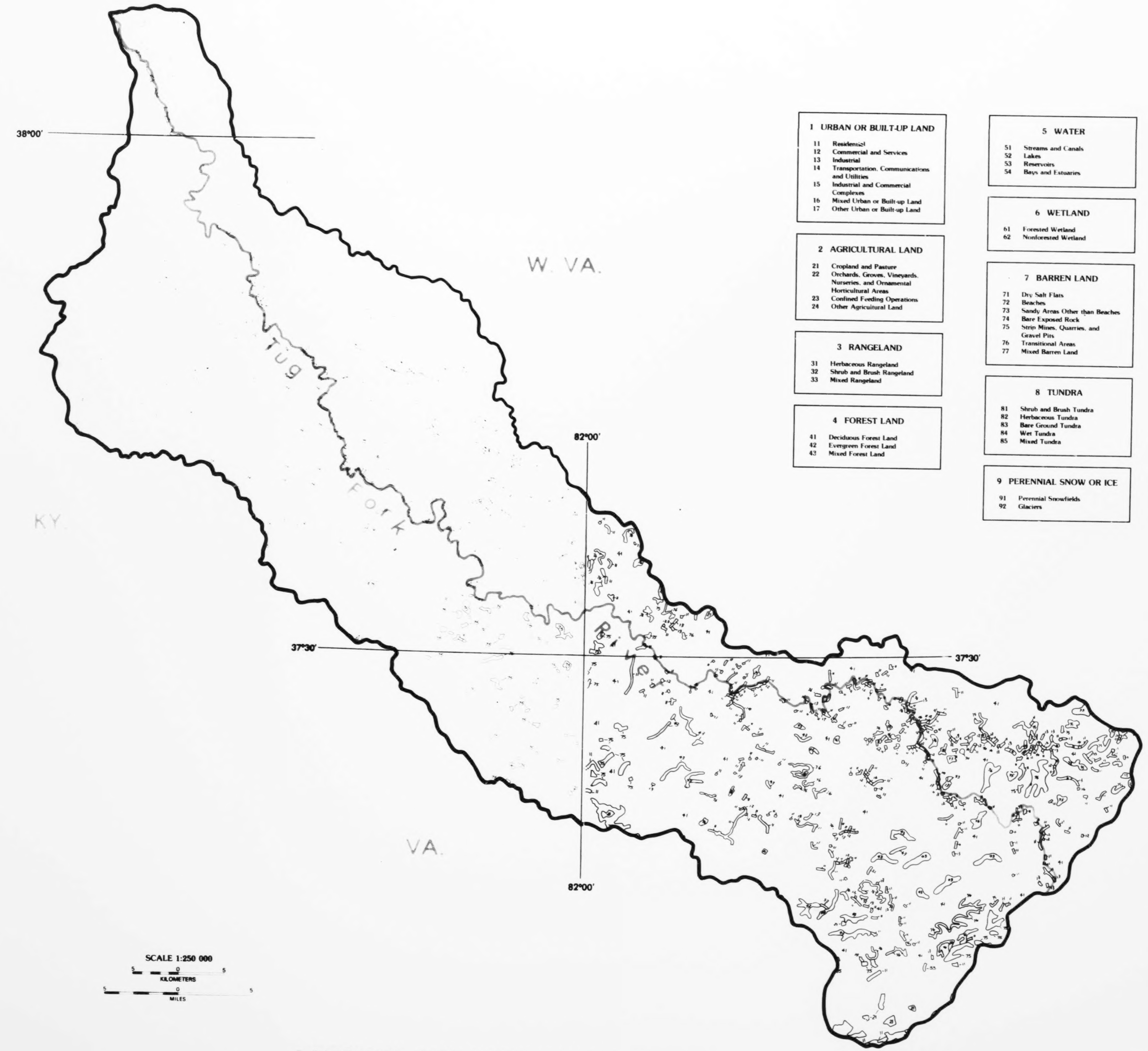
SCALES AS SHOWN

(From U.S. Army Corps of Engineers except profile for April 1977 flood. April 1977 profile from Runner and Chin, 1980)

FLOOD PROFILES FOR TUG FORK

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Open-File Report 80—1188
Plate C-1



LAND USE AND LAND COVER, 1973-76
TUG FORK RIVER BASIN

Base from U.S. Geological Survey, 1976, 1978a, and 1978b